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UNITED STATES PATENT AND TRADEMARK OFFICE

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March 5, 1985

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.00 each; PLANT PATENTS in color, $8.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1050 O.G. 330 on Jan. 15, 1985.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Domestic PCT fees were increased on Oct. 1, 1982 by a rule change to 37 CFR 1.445 that was published in the *Official Gazette* at 1021 O.G. 11 on Aug. 10, 1982.

The Search fee for the European Patent Office was changed as of Jan. 3, 1985 and was announced in the *PCT Gazette* at No. 26/1984 page 3241 on Nov. 8, 1984.

International PCT fees were changed by the PCT Assembly effective Jan. 1, 1985 and were announced in the *Official Gazette* at 1050 O.G. 330 on Jan. 15, 1985.

The current schedule of PCT fees is as follows:

Transmittal fee	$ 125.00
Search fee	
U.S. Patent and Trademark Office as Searching Authority	
• No corresponding prior U.S. national application filed	500.00
• Corresponding prior U.S. national application filed	250.00
European Patent Office as Searching Authority	
• All cases	690.00
International fees	
Basic fee (first 30 pages)	265.00
Basic Supplemental fee (for each page over 30)	5.00
Designation fee (for each national or regional office)	64.00
Designation fee for 11th and subsequent designations	no charge

Dec. 24, 1984.

GERALD J. MOSSINGHOFF,
Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), effective Nov. 1, 1984. If the maintenance fee is not paid in a patent requiring such payment, the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on Mar. 2, 1982 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Plant Patents	None
Utility Patents	4,317,237 through 4,318,188

Reissue Patents based on the above identified patents.

No maintenance fees are required for design patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 200.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 200.00
By other than a small entity . . . . . $ 400.00"

The amounts of the surcharges, effective Nov. 1, 1984, are set forth in 37 CFR 1.20(k)-(m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 100.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 50.00
By other than a small entity . . . . . $ 100.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee on a patent based on an application filed on or after Aug. 27, 1982, where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Board of Appeals Decisions Rendered in the Month of Jan. 1985

Affirmed	202
Affirmed in Part	27
Reversed	98
Total	327

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,080,542, Re. S.N. 657,047, Filed Oct. 2, 1984, Cl. 310/159, HIGH DENSITY FLUX MAGNETIC CIRCUIT, Albert L. De Graffenried, Owner of Record: *Inventor,* Attorney or Agent: Morgan, Finnegan, et al., Ex. Gp.: 212

4,306,787, Re. S.N. 562,822, Filed Dec. 19, 1983, Cl. 354/31, EXPOSURE CONTROL APPARATUS FOR CAMERA PROVIDED WITH MULTI METERING DEVICE, Toru Fukuhara, et al., Owner of Record: *Nippon Kogaku K. K., Tokyo, Japan,* Attorney or Agent: Joseph M. Fitzpatrick, et al., Ex. Gp.: 211

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

Des. 269,745, Reexam. No. 90/000,718, Requested: Jan. 29, 1985, Cl. D6/381, SETTEE, Stapleton Long, Owner of Record: *Berkline Corp., Morristown, Tenn.,* Attorney or Agent: David D. Kaufman, Ex. Gp.: 292, Requester: Berkline Corp., Chicago, Ill.

3,762,220, Reexam. No. 90/000,716, Requested: Jan. 24, 1985, Cl. 73/160, CONTINUOUS EVALUATION OF YARN CRIMP, James A. Gusack, et al., Owner of Record: *Badische Corp., Williamsburg, Va.,* Attorney or Agent: George Franke Helfrich, Ex. Gp.: 246, Requester: Owner

4,477,450, Reexam. No. 90/000,714, Requested: Jan. 23, 1985, Cl. 424/246, TRIAZOLO (4,3-C) PYRIMIDINES SUBSTITUTED BY NITROGEN-CONTAINING HETEROCYCLIC RINGS, James J. Wade, Owner of Record: *Riker Laboratories, Inc., St. Paul, Minn.,* Attorney or Agent: Robert W. Sprague, Ex. Gp.: 125, Requester: Owner

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Policy Regarding Storage, Retention and Availability of the Foreign Patent Documents in the Numeric Collection of the Patent & Trademark Office*

The U.S. Patent and Trademark Office (PTO) maintains the largest collection of foreign patent documents in the United States. This collection is a major technical information resource that supports the patent examination function as well as the PTO's mission of disseminating technical information. The collection is divided into two parts—the classified collection which is distributed among the examiners' search files, and the numeric collection which is maintained by the PTO's Scientific Library. A large portion of the numeric collection is in paper form, but it also includes considerable microfilm with some overlap between the two forms. Some of the documents are republished versions of earlier publications (e.g., unexamined and examined applications). One of the PTO's objectives has been to reduce the bulky paper foreign patent files in the numeric collection by replacing them, where possible, with good quality microfilm and by eliminating duplicates. A number of other considerations bear on the management of this collection. Because of the importance of the collection, the PTO has established a policy intended to ensure the effective storage, retention, and availability of the foreign patent documents in its numeric collection. The purpose of this notice is to inform the public of this policy which is set forth below.

The public is invited to consider and submit comments on the policy. Please address comments to:

William S. Lawson
Administrator for Documentation
U.S. Patent and Trademark Office
Washington, D.C. 20231

General Policy

The U.S. Patent and Trademark Office (1) is the National repository for all foreign patent documents, except design patents; (2) will maintain, in numerically retrievable collections, as many as possible of these documents for which there is or may be a reasonable level of need, and (3) will make these documents conveniently accessible to the PTO and to the public.

Implementation

1. The Scientific Library is responsible for policy implementation.

2. At least all post-1920 foreign patent documents needed to meet "Minimum Documentation" requirements of the Patent Cooperation Treaty will be housed in the Scientific Library in either paper or microfilm form.

3. All paper copies of foreign patent documents not needed to meet "Minimum Documentation" requirements will be housed either in the Scientific Library or other storage space in accordance with usage activity. The documents with greater activity will be housed in the Scientific Library until space therein is exhausted and the remaining documents will be housed in the other storage space.

4. All foreign journals (official gazettes) will be housed in the Scientific Library.

5. All paper copies of foreign patent documents needed for copy request fulfillment will be stored in a form accessible for prompt retrieval.

6. Whenever feasible, paper copies of foreign patent documents will be replaced by good quality microfilm.

7. 16mm roll microfilm will be the microform preferred for PTO use and archival storage. If 16mm microfilm is not available or is unacceptable, the Library may decide, on a case-by-case basis, whether a different microform should be obtained.

8. All microfilm of foreign patent documents intended for use by the PTO and the public will be housed in the Scientific Library. All archival microfilm will be housed in a facility that is suitable for the preservation and protection of the microfilm and for needed access.

9. Paper copies of foreign patent documents will be disposed of if good quality microfilm of the corresponding documents is available in the Library, good quality *archival* microfilm is available in the PTO, and the PTO has the legal rights to sell paper copies made from the microfilm and to reproduce the microfilm for internal use; paper copies for which there is little or no demand may be disposed of despite the availability of only marginal-quality microfilm. Paper copies for which good quality microfilm is available in the Library, but for which the other conditions noted above are not met, will be retained, although they need not be stored in a form accessible for prompt retrieval. However, such documents will be stored in accordance with a procedure designed to ensure preservation of the documents, adequate records of stored material and efficient utilization of space.

10. Where an application has been republished, a decision will be made on a "country-by-country" basis as to whether the duplicate version or versions of the initial document will be retained. The basis for this decision will be the current or anticipated utility of the duplicate documents to the PTO and the public.

11. Collections of paper copies that are not needed by the PTO will be disposed of promptly. Such collections will first be offered, for a limited time, to developing countries through the World Intellectual Property Organization. Collections which cannot be disposed of in this manner may then be disposed of, preferably by offering them for sale, as part of some exchange, or as gifts. However, if unneeded paper copy collections cannot be disposed of in a beneficial manner within a reasonable period of time, they will be discarded.

12. Requests for copies of foreign patent documents from within the PTO and from the public will be fulfilled promptly.

13. Fees to the public for copies of foreign patent documents wil be set at a level commensurate with full cost recovery and with the provision of prompt, efficient copy service.

14. As the complete text of foreign patent documents is captured in electronic form and becomes retrievable, numerically and otherwise, to the PTO and to the public, in the automated patent system, paper copies will be disposed of and the retention of microfilm reconsidered.

15. It is recognized that this policy does not provide for all possible circumstances regarding the foreign patent document collection and there may be limited instances where some deviation from the policy is justified. In such cases, the deviation will be justified in writing by the Program Manager of the Scientific Library and approved by the Administrator for Documentation and the Assistant Commissioner for Patents.

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* The PTO also maintains a very large, technologically classified collection of foreign patent documents. This policy *does not* apply to the classified collection.

WILLIAM S. LAWSON,
Nov. 26, 1984. *Administrator for Documentation.*

Errata

"All reference to Patent No. 4,491,048 to Gerd Hoptner, et al. of Germany for 'BAND SAW BLADE STUDDED WITH CARBIDE PLATES' appearing in the Official Gazette of Jan. 1, 1985, should be deleted since no patent was granted."

"All reference to Patent No. 4,497,456 to James R. Crapser of Racine County, Wis. for 'VAPOR-DISPENSING PAPER ROLL HOLDER' appearing in the Official Gazette of Feb. 5, 1985, should be deleted since no patent was granted."

Department of Commerce
Patent and Trademark Office
37 CFR Parts 1, 2, and 10
Docket 407 88-4181
Practice before the Patent and Trademark Office

Agency: Patent and Trademark Office, Commerce
Action: Final Rule
Summary: The Patent and Trademark Office (PTO) is amending its rules governing practice before the PTO by attorneys and agents. These rules are needed to clarify and modernize the rules relating to admission to practice and the conduct of disciplinary cases. The rules are also needed to set out in the Code of Federal Regulations a PTO Code of Professional Responsibility. By amending the rules, the PTO believes the standards for admission to practice in patent cases will be more easily understood, that those practicing before the PTO will have ready access to a code of professional responsibility, and that procedure in disciplinary cases will be more easily understood. The PTO expects that the conduct of disciplinary proceedings under these rules will be more effective and less costly.
Dates: The effective date of these rules (except §1.21(a)(5) and (6)) is Mar. 8, 1985. Section 1.21(a)(5) and (6) is effective Apr. 8, 1985.
For Further Information Contact: Fred E. McKelvey by telephone at (703) 557-4025 (if no answer, message may be left at 703-557-4103) or by mail marked to his attention and addressed to Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.
Supplementary Information: Attorneys and agents practice before the Patent and Trademark Office (PTO) in patent cases. 35 U.S.C. 31. Attorneys also practice before the PTO in trademark and other non-patent cases. 5 U.S.C. 500(b). A few agents also practice before the PTO in trademark cases under rules in force prior to Jan. 1, 1957.

A notice of proposed rulemaking for attorney and agent conduct and disciplinary procedure was published on Aug. 11, 1983 in the *Federal Register,* 48 F.R. 36478, and on Sept. 20, 1983 in the *Official Gazette,* 1034 O.G. 39, 1034 TMOG 33. A notice extending the comment period and setting a second hearing was published on Oct. 5, 1983 in the *Federal Register,* 48 F.R. 45424, and on Oct. 18, 1983, in the *Official Gazette,* 1035 O.G. 19, 1035 TMOG 17. The PTO decided to withdraw, and not adopt, the rules proposed in the *Federal Register* notice of Aug. 11, 1983. There were numerous objections to the proposed rules and the public indicated that a longer period for study and review of a code of conduct and disciplinary procedures was necessary.

An advance notice of proposed rulemaking setting out revised rules being considered for standards of conduct and disciplinary proceedings was published on Mar. 16, 1984, in the *Federal Register,* 49 F.R. 10012, and on Apr. 10, 1984, in the *Official Gazette,* 1041 O.G. 15, 1041 TMOG 13. Numerous organizations and individuals filed comments in response to the advance notice.

On Aug. 24, 1984, the PTO published in the *Federal Register* a notice of proposed rulemaking. 49 F.R. 33790. On Aug. 28, 1984, the notice was also published in the *Official Gazette.* 1045 O.G. 29; 1045 TMOG 25. The notice also appeared in the Bureau of National Affairs, *Patents, Trademark & Copyright Journal,* Vol. 28, No. 694, pp. 485-515 (Aug. 30, 1984). Twenty-two written comments were timely received in response to the notice of proposed rulemaking. The comments are analyzed herein. A hearing was held on Oct. 10, 1984. Five individuals appeared at the hearing. Oral comments made at the hearing are also analyzed herein. The twenty-two written comments and a copy of the transcript of the hearing are available for public inspection in Room 12B10, Crystal Gateway II, 1225 Jefferson Davis Hgw., Arlington, Va.

This notice of rulemaking sets out rules in three areas:

(1) Practice of attorneys and agents before the PTO in patent, trademark, and other non-patent cases (§§10.2 through 10.19);

(2) A PTO Code of Professional Responsibility (§§10.20 through 10.112); and

(3) Rules governing (a) investigation of possible violations of the PTO Code of Professional Responsibility and (b) disciplinary proceedings to reprimand, suspend, or exclude (disbar) individuals from practicing before the PTO who, after notice and opportunity for a hearing, are found to have violated a disciplinary rule of the PTO Code of Professional Responsibility (§§10.130 through 10.170).

Familiarity with the advance notice and notice of proposed rulemaking is assumed. Changes in the text of the rules published for comment in the notice of proposed rulemaking are discussed. Comments received in response to the notice of proposed rulemaking are discussed. Comments not timely received in response to the advance notice are also discussed.

Tables 1, 2, and 3 are included in this notice to assist readers in correlating present rules with the new rules and to find the principal source for the new rules. An indication in Tables 1, 2, or 3 that a section is "new" means that a corresponding section does not currently appear in Tile 37 of the Code of Federal Regulations.

Table 1 shows the principal sources of the new rules which relate to (1) admission to practice of attorneys and agents in patent cases and (2) practice in trademark and other non-patent cases.

Table 2 shows the principal sources of the rules for the new PTO Code of Professional Responsibility.

Table 3 shows the principal sources of the new rules for disciplinary proceedings.

Other sources for, and rationale in support of, the proposed rules are discussed in the Supplementary Information of the advance notice, 49 F.R. 10012-10022, and the Supplementary Information of the notice of proposed rulemaking, 49 F.R. 33790-33803.

In issuing these rules, the PTO has made every effort to minimize preemption of State control over the prac-

tice of law. Thus, in §10.1, second sentence, the new rules provide:

> Nothing in . . . [these rules] shall be construed to preempt the authority of each State to maintain control over the practice of law, except to the extent necessary for the Patent and Trademark Office to accomplish its federal objectives.

This provision of §10.1 is based on language in *Sperry* v. *Florida ex rel, Florida Bar,* 373 U.S. 379, 402 (1963), and makes clear the PTO's intent to regulate only conduct related or relevant to practice before the PTO.

In an effort to ascertain whether the proposed rules would have any adverse impact on the States, copies of both the advance notice of Mar. 16, 1984, and the notice of proposed rulemaking of Aug. 24, 1984, were sent to Bar Counsel in each State. The PTO received responses from Bar Counsel in Ala., Conn., Fla., Ga., Md., Miss., Nebr., Tex., and Vt. Comments were also received from the National Organization of Bar Counsel, the American Bar Association, and others.

Alaska Bar Counsel, contrary to other bar counsel filing comments, suggested that creation of a PTO Code of Professional Responsibility would be "inherently confusing" to any attorney practicing in a State and also before the PTO. The new rules, however, do not establish for the first time a PTO Code of Professional Responsibility. The current PTO code appears in 37 CFR §§1.344 and 2.12. Sections 1.344 and 2.12 merely incorporate by reference the Code of Professional Responsibility of the American Bar Association (1970). The new PTO code more appropriately sets out the standards of conduct relevant to the practice of law before the PTO. Alaska Bar Counsel also felt that it would be more appropriate if the PTO brought alleged ethics violations by attorneys to local state enforcement authorities. This view was not shared by other bar counsel who filed comments. The statute (35 U.S.C. 32) authorizes the Commissioner to administer discipline. The PTO has taken disciplinary action in instances where a State has declined to do so. Moreover, there are registered patent agents who are not subject to discipline by State enforcement agencies. Finally, Alaska Bar counsel suggested that "adjudicative agencies" are too closely involved in a disciplinary matter to be impartial. Congress has determined otherwise. 35 U.S.C. 32 and 5 U.S.C. 500(d).

Comments were received from the Statewide Grievance Committee of Connecticut in response to the advance notice. Many helpful suggestions were made in the comments. Most of the suggestions were adopted at the time the notice of proposed rulemaking was published.

The Florida Bar, through its Director of Lawyer Regulation, filed comments in response to the notice of proposed rulemaking. The Florida Bar commented on §§10.1(c) and 10.23(c) (5). The PTO's response to the comment appears later in this notice under a discussion of §10.1.

An Assistant General Counsel of the State Bar of Georgia filed a response to the advance notice. The response stated, among other things: "Although due to the press of business at the present time I am unable to provide a substantive response in this correspondence, I will respond within the appropriate time limits after having an opportunity to study the enclosed . . . [advance notice]." No further response was received.

Bar counsel for the Attorney Grievance Commission of Maryland filed a response to the advance notice. In his response Bar Counsel states in part:

> It does not appear to me that any of the proposed Rules would present any difficulty in the administration of discipline within Md.

Complaint Counsel for Miss. responded to the advance notice. He stated in part:

> I have not reviewed the proposed Code in comparison with the Code of Professional Responsiblity in great detail. In general however I can state that adoption of the proposed Code would not have an adverse effect upon the function of this office.

The General Counsel of the State Bar of Texas responded to the advance notice and did "not perceive that any problem would be created by . . . [the proposed rules] in Tex." The General Counsel did express the thought that the PTO's use of the word "practitioner" instead of "lawyer" would not prevent reciprocal discipline in Tex. based on disciplinary action by the PTO. The PTO sees no reason for disagreeing with the General Counsel. The word "practitioner" is used by the PTO to define registered attorneys, registered agents, *and* other attorneys authorized to practice in trademark and other non-patent cases before the PTO under 5 U.S.C. 500(b).

The Chairman of the Professional Conduct Board of Vermont responded to the advance notice. He states in part:

> I find nothing contained in the proposed rules which would present any difficulty in the administration of disciplinary matters within the State of Vermont. Further, I see no problems created vis-a-vis the Code of Professional Responsibility in this jurisdiction.

The President of the National Organization of Bar Counsel responded to the notice of proposed rulemaking. He expressed a concern as to whether the PTO intended to "provide for notice and information of . . . [each disciplinary violation by an attorney] to each jurisdiction where the attorney is licensed." Two provisions of the rules are designed to insure that States are notified of PTO disciplinary action. Section 10.158(b) (1) requires a disciplined attorney to notify all bars of which he or she is a member and to file a copy of the notice with the Director of Enrollment and Discipline of the PTO. Section 10.159(a) requires the Director to notify known state bars and appropriate bar associations of PTO disciplinary action. In addition, as a matter of policy, the PTO intends to notify the National Discipline Data Bank of the American Bar Association.

Comments were filed in response to the advance notice and the notice of proposed rulemaking by the Standing Committee on Professional Discipline of the American Bar Association. The comments filed in response to the advance notice were analyzed in the notice of proposed rulemaking and are not re-analyzed in this notice. In its comments responding to the notice of proposed rulemaking the Standing Committee made several helpful suggestions, some of which are being adopted. A full discussion of the PTO rationale for adopting or not adopting a particular suggestion appears under analysis of comments later in this notice. The Standing Committee urged adoption of the 1983 ABA Model Rules. The PTO is not now adopting the Model Rules *inter alia* because most States have not adopted those rules. If a significant number of states adopt the Model Rules, the PTO will consider further amendments to its Code of Professional Responsibility. The Standing Committee suggested changes to §10.23(c) (12) which are being adopted in part. The Standing Committee suggested that notice be given to a practitioner prior to any meeting of the Committee on Discipline. This suggestion is not being adopted. In most instances, a practitioner will be able to respond to a notice under 5 U.S.C. 558(c). The Committee will have the practitioner's response at the time of its deliberation. The Standing Committee urged that hearings in disciplinary matters should be open to the public. Others opposed this position. The PTO is not adopting this suggestion in view of 35 U.S.C. 122. Further rationale for not adopting the Standing Committee's suggestion appears later in the notice. The Standing Committee urged a change in §10.149 to make the burden for proving a disciplinary violation one of "clear and convincing evidence." This suggestion is being adopted. The Standing Committee urged that more discovery be permitted than was authorized by §10.152 as proposed. This suggestion is being adopted as explained further in this notice. The Standing Committee also thought §10.159 should provide for notice to the ABA National Discipline Data Bank when the PTO administers discipline. While §10.159 will not specifically mention the Data Bank, a

change has been made to permit the Director to notify appropriate bar associations. The Data Bank is an appropriate bar association.

Changes in Text: Several changes have been made in the text of the new rules from the text of the proposed rules which were published for comment in the notice of proposed rulemaking. Those changes are discussed below.

In §1.8, the new subparagraph will be (xiii). Subparagraph (xii) was added when the rules relating to patent interference proceedings were amended. See 49 F.R. 48451 (Dec. 12, 1984).

In the first sentence of §1.31, the term "agent" has been changed to "registered agent" to make clear that only registered agents are intended.

Section 1.33(c) is being amended to delete a reference to former §§1.341 and 1.347 and to now refer to §§10.5 and 10.11.

Section 1.56(f) and (h) is being amended to delete a reference to former §1.346 and to now referred to §10.18.

In the second sentence of §10.1, "subpart shall" has been changed to "part shall" and "maintain control over" has been changed to "regulate." In the same sentence, "within its borders" has been deleted.

In §10.2(b) (1), "maintain the register" has been changed to "maintain the register provided for in §10.5".

In the next-to-the-last sentence of §10.7(b), "examining corps" has been changed to "patent examining corps".

The language "an alien" in §10.9(b) has been changed to read "a resident alien" to make clear that aliens registered under paragraphs (a) or (b) of §10.6 must be resident aliens.

In the first sentence of §10.14(c), "foreigner" has been changed to "foreign attorney or agent", "registered and in good standing" has been changed to "registered or in good standing", "applicants" has been changed to "parties" and "trademark applications" has been changed to "trademark cases".

In §10.18(a) (1), "the paper has been read" has been changed to "the paper has been read by the practitioner".

Several changes have been made in §10.23.

In §10.23(c) (4) (iii), "improperly" has been added before "bestowing."

In §10.23(c) (5), "on ethical grounds" has been added after the first occurrence of "attorney or agent" and "suspension or disbarment as an attorney or agent" (after "10.6(c)") has been deleted.

In §10.23(c) (7), "patent" has been added before "application of another" and the following has been added as a second sentence: "See §§1.604(b) and 1.607(c) of this Subchapter."

In §10.23(c) (8), "Failing to forward" has been changed to "Failing to inform a client or former client"; "inability to forward, to" has been changed to "inability to notify"; "client correspondence" has been changed to "client of correspondence"; "is correspondence which" has been changed to "is correspondence of which"; and "under the circumstances should be forwarded to the client or former client" has been changed to "under the circumstances the client or former client should be notified."

Section 10.23(c) (12) has been changed to read: "Knowingly filing, or causing to be filed, a frivolous complaint alleging a violation by a practitioner of the Patent and Trademark Office Code of Professional Responsibility."

In §10.23(c) (15), "including" has been changed to "making a" and "matter" has been changed to "statement".

In §10.36(b) (3), the language "in the locality" has been deleted.

The following language has been deleted from §10.40(c): ", and may not withdraw in other matters,".

In §10.62(b), the language "contemplated or pending litigation or" has been deleted.

In §10.63(a), the language "contemplated or pending litigation or" has been deleted. Both occurrences of "trial or" have been deleted from §10.63(a). The language "contemplated or pending litigation or" has been deleted from §10.63(b).

The following sentence has been added to §10.64(b): "A practitioner may, however, advance any fee required to prevent or remedy an abandonment of a client's application by reason of an act or omission attributable to the practitioner and not to the client, whether or not the client is ultimately liable for such fee."

In §10.84(a) (3), "§10.85" has been changed to "this part".

The following sentence has been added to §10.87(a): "It is not improper, however, for a practitioner to encourage a client to meet with an opposing party for settlement discussions."

Subparagraph (5) of §10.89(c) as it appeared in the notice of proposed rulemaking has been deleted. Subparagraph (6) of §10.89(c) as it appeared in the notice of proposed rulemaking has been changed to read: "(5) Engage in undignified or discourteous conduct before the Office (see §1.3 of this Subchapter)." Subparagraph (7) of §10.89(c) has been redesignated as subparagraph (6).

In §10.112(a), the language:

> maintained: (1) in the case of a practitioner whose office is located in the United States, the State in which the practitioner's office is situated or (2) in the case of a practitioner having an office in a foreign country or registered under §10.6(c) in the United States or the foreign country

has been changed to read:

> maintained in the United States or, in the case of a practitioner having an office in a foreign country or registered under §10.6(c), in the United States or the foreign country.

In §10.131(a), the second sentence has been deleted as being unnecessary in view of §10.132(b). The second sentence of §10.131(a) in the notice of proposed rulemaking read: "The investigation shall be such as to determine whether there is probable cause to believe that a violation of a Disciplinary Rule by a practitioner has occurred."

In the first sentence of §10.132(a), the language "that there is probable cuase to believe" has been deleted. The Committee on Discipline, not the Director, shall determine whether there is probable cause to believe that a practitioner has violated a Disciplinary Rule. See §§10.4(b) and 10.132(b).

Several changes have been made in §10.133. In the first sentence of §10.133(b), the language "§§10.132(b) and 10.134" has been replaced with "§10.134". The reference to §10.132(b) is not necessary. The language "his or her resignation by filing" in §10.133(b) has been deleted as unnecessary. The second sentence of §10.133(b) has been modified to become new paragraphs (c) and (d). Paragraph (c) indicates the content of an affidavit of resignation filed prior to the date set by the administrative law judge (ALJ) for hearing. Paragraph (d) indicates the content of an affidavit of resignation filed on or after the date set by the ALJ for hearing. Paragraph (c) has been redesignated as new paragraph (e). In addition, the language "paragraph (b)" therein has been changed to "paragraphs (b) or (c)". Paragraphs (d) and (e) have been redesignated as new paragraphs (f) and (g), respectively.

In §10.135(a) (2) (i), "Committee on Enrollment" has been changed to "Director".

In §10.149, "a preponderance of" has been changed in both instances to "clear and convincing".

Several changes have been made to §10.152 to expand discovery. Paragraphs (a) and (b) of §10.152 as set out in the notice of proposed rulemaking have been redesignated as paragraphs (e) and (f), respectively, and new paragraphs (a) through (d) have been added. New paragraph (a) sets forth discovery which is authorized. New paragraph (b) sets forth matter which *cannot* be discovered. Paragraph (c) sets forth factors which an ALJ can consider in determining whether to authorize discovery. Paragraph (d) requires that a motion be filed which addresses specifically and separately each particular re-

quest for discovery. In paragraph (e) (formerly paragraph (a)), a new subparagraph (3) has been added to specify that the ALJ may require the parties to set out in a pre-hearing statement information related to expert witnesses. Old subparagraphs (3) and (4) have been redesignated as new subparagraphs (4) and (5), respectively.

In §10.154(b), a new subparagraph (5) has been added which states: "(5) any extenuating circumstances."

In §10.155(a), both occurrences of "on the respondent" have been deleted.

Several changes have been made to §10.158. In §10.158(b) (1), after "all clients of the practitioner" the following has been added "for whom he or she is handling matters before the Office". In §10.158(b) (2), "client's active case files" has been changed to "client's active Office case files". In §10.158(c), changes have been made to make paragraph (c) applicable to corporate patent departments and to prohibit a suspended or excluded practitioner from meeting in person or in the presence of another practitioner with an official of the PTO in connection with the prosecution of a patent, trademark, or other case.

The following has been added to the end of §10.159(a): "and any appropriate bar associations,"

Several changes have been made in §10.160(c). "A practitioner has been suspended or excluded" has been changed to "An individual who has resigned under §10.133 or who has been suspended or excluded". The language "if the Director is satisfied" has been changed to "when the individual makes a clear and convincing showing". The language "suspended or excluded practitioner" has been changed to "individual".

Response to and Analysis of Comments: Twenty-two (22) written comments where timely received in response to the notice of proposed rulemaking. The comments have been analyzed. Some suggestions made in comments have been adopted and others have been rejected. A detailed analysis of the timely received comments follows. Several comments were not timely received by July 9, 1984, in response to the advance notice of proposed rulemaking of Mar. 16, 1984. These comments have now been considered and are analyzed herein.

Several comments were received which suggested that the rules purport to regulate attorney conduct beyond that necessary or proper for administration of federal programs by the PTO. It is not, and has never been, the intention of the PTO to regulate conduct except to the extent necessary for the accomplishment of federal objectives. Thus, only that conduct which is relevant to the practice of patent, trademark, or other law *before the PTO* is what the PTO seeks to regulate. The preamble of §10.1 indicates that Subpart 10 governs solely the practice of patent, trademark, and other law before the PTO. As noted in the preamble to §10.1, "[n]othing in this subpart shall be construed to preempt the authority of each State to regulate the practice of law, except to the extent necessary for the Patent and Trademark Office to accomplish its federal objectives." See *Sperry* v. *Florida ex rel. Florida Bar,* 373 U.S. 379, 402 (1963). See also *Michigan Canners and Freezers Ass'n.* v. *Agricultural Marketing and Bargaining Board,* 104 S. Ct. 2518, 2523 (1984) (State Law is preempted when it stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress) and *Fidelity Federal Savings and Loan Ass'n.* v. *de la Cuesta,* 102 S. Ct. 3014, 3022 (1982) (federal regulations have no less preemptive effect than federal statutes).

Several comments were received concerning §10.1. The Florida Bar noted that in the notice of proposed rulemaking the PTO indicated "that failure to pay State bar dues is not a basis for suspension or exclusion before the PTO because failure to pay the dues has no relationship to the federal objectives which the PTO seeks to accomplish." 49 F.R. 33795, column 1, third full paragraph. The Florida Bar suggested that "the loss of good standing [should] be of concern to the PTO." The PTO agrees in part. Suspension from a State bar for failure to pay dues will not be viewed by the PTO as "misconduct." See §10.23(c) (5), which has been changed to define misconduct as suspension or disbarment on ethical grounds. If an attorney is suspended by his or her State bar for failure to pay bar dues, and for that reason is no longer in good standing before the State bar, that attorney is no longer an attorney within the meaning of §10.1(c). An attorney suspended from his or her State bar for failure to pay bar dues would no longer be eligible to represent individuals before the PTO in trademark and other non-patent cases.

One commentator suggested that the second sentence of §10.1 be changed to read: "Nothing in this subpart shall be construed to preempt the authority of each State to regulate the practice of law, except to the extent necessary for the Patent and Trademark Office to accomplish its federal objectives." The suggestion is being adopted. The commentator noted that as originally proposed in the notice of proposed rulemaking, the phrase "to maintain control over the practice of law within its borders" is unduly restrictive. The commentator correctly pointed out that "[c]ertainly, New York would have the authority to regulate the practice of law by a New York attorney residing in Fla."

Another commentator noted the language "federal objectives" in §10.1 and felt it would be appropriate for the PTO "to set forth what the federal objectives really are." The PTO does not believe it is appropriate to set out in the regulations specific federal objectives. The PTO engages in the examination of applications for patents, reexamination of issued patents, examination of applications for registrations of trademarks, and numerous *inter partes* patent and trademark proceedings. The federal objectives of the PTO center around these activities.

With respect to §10.2(c), one commentator argued that "it is unfair to require the payment of a fee to review a final decision of the Director." The PTO disagrees. The review provided by §10.2(c) is a service preformed by the PTO for which a fee may be charged. There is no compelling reason for not charging a fee.

Several comments were received discussing §10.4. One commentator suggested "that a provision for no discovery or testimony from a member of the Committee on Discipline is unfair and inappropriate." The PTO does not believe that a "mini-trial" should be conducted in a subsequent disciplinary proceeding of how or why the Committee on Discipline reached its decision. The commentator also argued that 10.4(c) "would be in direct conflict with the Federal Rules of Civil Procedure" in any review in the U.S. District Court for the District of Columbia. Again, the PTO disagrees. The Federal Rules of Civil Procedure do not apply to disciplinary cases in the PTO. Moreover, those rules do not apply in cases seeking judicial reivew of a decision of the Commissioner in a disciplinary matter. Applicable law (35 U.S.C. 32 and Local Rule 1-26 of the district court) provides for review on the record made in the PTO. See also *Camp* v. *Pitts,* 411 U.S. 138 (1973). Hence, there is no discovery in a proceeding under 35 U.S.C. 32.

Comments were received which suggest that the associate and assistant solicitors in the Office of the Solicitor cannot be isolated from the Solicitor and the Deputy Solicitor. The associate and assistant solicitors are to be isolated so that (1) the associate and assistant solicitors may act as attorney for the Director in prosecuting a disciplinary proceeding and (2) the Solicitor and Deputy Solicitor may act as legal advisor to the Commissioner in deciding a disciplinary matter. In disciplinary matters, the associate and assistant solicitors will report directly to the Director. Associate and assistant solicitors will not have occasion to discuss disciplinary matters with the Solicitor or Deputy Solicitor.

The following discussion in the *Attorney General's Manual on the Administrative Procedure Act,* pp. 57-58 (1947), commenting on original §5(c) (now 5 U.S.C. 554(d)) is believed particularly relevant to the issues raised in the comments:

> Assuming that an agency will in many cases wish to consult with certain of its staff members, it may pro-

ceed in one of two ways. It may in a particular case consult with staff members who in fact have not performed investigative or prosecuting functions in that or a factually related case. In the alternative, the agency may find it feasible so to organize its staff assignments that the staff members whom it most frequently desires to consult will be free of all investigative and prosecuting functions.

* * * * *

[I]f the agency so organizes its staff that the general counsel is not responsible for the investigative and prosecuting functions, he would be regularly available to the agency for consultation on the decision of cases.[8]

[8]The general counsel's participation in rule making and in court litigation would be entirely compatible with his role in advising the agency in the decision of adjudicatory cases subject to section 5(c).

Several commentators suggested that members of the public or the PTO bar should be members of the Committee on Discipline. This suggestion is not being adopted. As noted in the notice of proposed rulemaking (49 F.R. 33793, column 2, last paragraph), there are two reasons for not adopting the suggestion. Use of individuals outside the PTO is made difficult by 35 U.S.C. 122. Administrative delays would take place because it would be more difficult to schedule meetings.

One commentator suggested that the language "at least" in the phrase "at least three employees of the Office" should be deleted from the second sentence of §10.4(a). This suggestion is not being adopted. The"at least" language will permit the Commissioner to appoint alternate members to substitute for a member who may be disqualified or who may be unavailable for an extended period.

Section 10.10 provides that only practitioners who are registered under §10.6 or individuals given limited recognition under §10.9 will be permitted to prosecute patent applications of others before the PTO. One comment was received which noted that the rules do not address the "status" of (a) "an individual in a training program directed to the preparation and prosecution of applications for patent" or (b) "a long-time employee working within a patent organization in the area of preparation and prosecution of applications for patent, but has never become registered to practice as either a Patent Agent or Patent Attorney." The commentator suggested that the rules should state what such individuals or employees may do. The suggestion is not being adopted. Only registered practitioners (attorneys and agents) may practice patent law before the PTO. The commentator also suggested that the rules should provide that long-time corporate or government employees who have never been registered should be given limited recognition by the PTO. This suggestion is not being adopted. Limited recognition will be given only on a case-by-case basis. See §10.9.

One comment suggested that "applicants" and "trademark applications" in the first sentence of §10.14(c) rendered it unclear whether an individual authorized to practice before the PTO in trademark cases could prosecute post-registration cases, such as a cancellation proceeding. The rule has been clarified by changing "applicants" to "parties" and "trademark applications" to "trademark cases". An individual authorized to represent others under §10.14 is authorized to appear in any trademark case.

Several comments were received discussing §10.18. One comment made at the hearing suggested that the rule should specify who should read the paper being signed. The commentator stated: "I think it would be salutary if what you really mean is that the practitioner who signs it has read it." The suggestion is being adopted and the language of §10.18(a) (1) has been changed from "the paper has been read" to "the paper has been read by the practitioner".

Two individuals commented that requiring the signature of a practitioner would eliminate the "custom" of having an associate sign the name of a principal attorney on a paper which the principal authorizes the associate to file. Section 10.18 requires that the practitioner signing the paper sign his or her own name. The rule would permit associate attorney John Smith to sign on behalf of principal attorney David Jones by signing the paper as follows: "David Jones by John Smith." The rule would not permit Smith to merely sign Jones' name or to sign "David Jones by JS." The rule does not authorize a non-practitioner (e.g., a para-legal or secretary) to sign a paper on behalf of a practitioner.

One comment asked the following:

Assume an inventor is under Final Rejection and the period for proper response is near at hand. The attorney is now instructed to "keep the case alive" until a CIP [continuation-in-part] is prepared and filed. For reasons outside the control of the attorney, the CIP cannot be filed in time. Assume now the attorney files a Notice of Appeal, *never intending* to prosecute the appeal, intending only to buy time until the CIP can be filed. Would the filing of the Notice of Appeal violate Rule 10.18 and subject the attorney to PTO disciplinary action?

A notice of appeal is a proper response to a final rejection. Accordingly, it would not appear under the circumstances outlined that the notice of appeal was "interposed for delay" within the meaning of §10.18(a) (4).

Three comments were received discussing §10.22. One comment suggested that modifiers, such as "knowingly" and "willfully" be inserted in paragraphs (a) and (b) of §10.22. The suggestion is not being adopted. A "materially false statement," a failure "to disclose a material fact," or furthering the application of another "known . . . to be unqualified" constitute acts which cannot be characterized as innocent. Accordingly, there is no need to insert the "modifiers" in the text of the rule. Another commentator suggested that the provisions of §10.22 are not relevant to the federal objectives of the PTO. The PTO disagrees. Practitioners who (1) fail to tell the truth, (2) fail to reveal material information or (3) knowingly further the application of an unqualified individual to a bar, demonstrate that they are "disreputable" within the meaning of 35 U.S.C. 32. A third commentator suggested that §10.22(b) is too broad because a practitioner could recommend an individual for membership in a bar and the individual might fail to pass the bar examination. Unless a practitioner has good reason to know that the individual will fail to pass a bar examination, it is not apparent how the practitioner's recommendation could amount to a violation of the PTO Code of Professional Responsibility.

Numerous comments were received discussing §10.23. One comment suggested that §10.23(c) (8) be changed to require notification of a client rather than requiring correspondence to be forwarded. This suggestion has been adopted by making appropriate changes to §10.23(c) (8).

A suggestion was made to delete the reference to $5000 in §10.23(c) (17). This suggestion is not being adopted. See the discussion in the advance notice, 49 F.R. 10016, column 1.

A suggestion was made that §10.23(c) (5) has "a built-in inequity as regards different patent attorneys in different states." According to the commentator, a practitioner suspended for an act by Ohio might not be suspended for the same act by New York. The commentator reasons it would be unfair for the Office to suspend the Ohio practitioner, but not the New York practitioner. The commentator's concern is not warranted in view of the second sentence of §10.1.

Another commentator noted that §10.23(a) (3) "points up the difficulty of superimposing . . . [a] set of rules on of the various local jurisdictions." Here again, the commentator's concern is not believed warranted in view of the second sentence of §10.1. Another commentator noted that "moral turpitude" is hard to define. It was suggested that possession of marijuana is regarded as a crime involving moral turpitude in some states where a 99-year sentence may be received. It was suggested that in other states possession of marijuana might result in "a slap on the wrist." If a practitioner is incarcerated for a

crime in a state, it follows that the practitioner is not capable of representing individuals before the Office. This is true even if the same practitioner would not have been incarcerated in another state for the same act.

The Florida Bar raised a question concerning §10.23(c) (5) which is answered under the discussion above of §10.1. Section 10.23(c) (5) has been changed to make suspension or disbarment "on ethical grounds" a basis for suspension or disbarment by the Office. "Ethical grounds" would include incompetence, but would not include failure to pay State bar dues.

One comment suggested that "disreputable" and "gross misconduct" in §10.23(a) be defined. The terms "disreputable" and "gross misconduct" appear in 35 U.S.C. 32 and need no further definition in the rules. For a discussion of "disreputable," see *Poole* v. *United States*, 54 A.F.T.R. 2d (P-H) 84-5536 (D.D.C. June 29, 1984).

Several comments suggested that the Model Rules of Professional Conduct of the American Bar Association (1983) be adopted in place of §10.23. Adoption of the Model Rules was given consideration prior to publication of the advance notice and the notice of proposed rulemaking. The matter has been considered again. However, it has not been demonstrated to the Office that a large number of states have adopted the Model Rules. As noted in the notice of proposed rulemaking, at least Va. has rejected the Model Rules. Accordingly, the PTO will not, at this time, adopt the Model Rules. If a large number of states adopt the Model Rules in the future, the PTO would be willing to reconsider its position.

One comment suggested that "before the Office" be inserted after the word "conduct" in §10.23(b) (4), (5), and (6). This suggestion is not being adopted in view of the second sentence of §10.1.

A suggestion was received that "improperly" be inserted at the beginning of §10.23(c) (4) (iii). This suggestion has been adopted.

A suggestion was received that the word "patent" be inserted before "application" in §10.23(c) (7). This suggestion has been adopted.

A suggestion was received that §10.23(c) (15) be changed so that a trademark practitioner could present potentially scandalous subject matter in order to receive a determination on the merits of registrability. See e.g., *In re McGinley*, 660 F.2d 481, 211 USPQ 668 (CCPA 1981). Section 10.23(c) (15) has been changed to refer only "making a scandalous or indecent statement in a paper filed in the Office."

Several individuals suggested that it may be difficult to determine the identity of the "client" under §10.23(c) (8), particularly in corporate patent departments. The PTO will presume that practitioners know the identities of their clients and that information conveyed to the client is being conveyed in a manner acceptable to the client.

Section 10.23(c) (12) has been changed in response to comments which suggested that it would be difficult for practitioners to comply with §10.23(c) (12) on the one hand and §§10.24 and 10.131 on the other hand. The purpose of §10.23(c) (12) is to eliminate a frivolous complaint against practitioners. Accordingly, §10.23(c) (12) has been changed to define as misconduct "knowningly filing, or causing to be filed, a frivolous complaint alleging a violation by a practitioner of the Patent and Trademark Office Code of Professional Responsibility."

Several individuals criticized §10.24. The provisions of §10.24 are derived from DR 1-103 of the Code of Professional Responsibility of the American Bar Association (1970)—the rule currently applicable to practitioners. See 37 CFR §§1.344 and 2.13. The PTO is not aware that the current rule causes any problems. Accordingly, the numerous suggestions to delete or amend §10.24 are not being adopted.

One comment was received which suggested that charging another person with trademark infringement and requesting that the person withdraw a pending application "might be . . . interpreted as a violation" of §10.31(a). The PTO disagrees. A reasonable interpretation of the rule does not justify the unreasonable construction by the commentator.

At the hearing, an individual discussed §10.32. The individual suggested that three "practices" should be sanctioned under any PTO Code of Professional Responsibility and it was suggested that all three practices might be prohibited by §10.32. *First*, the individual suggested that "the giving of moderately priced presents . . . to established clients on appropriate occasions—Christmas, weddings of their daughters" should not constitute a violation of §10.32. The PTO agrees. The giving of a gift to an "established client" on the occasions suggested is not a gift "to a person for recommending the practitioner's services." *Second*, the individual suggested that a practitioner should not be prohibited from "paying for ordinary client entertainment." The PTO agrees. Again the "client" is not "a person recommending the practitioner's services" in return for being entertained. *Third*, the individual argued that the rules should not preclude an "exchange of cases with foreign practitioners." An "exchange" was said to occur "[w]here a foreign patent practitioner in his country sends cases to an American patent or trademark practitioner to prosecute before the PTO, and you send the foreign firm cases to prosecute before the foreign patent office, on the more or less explicit basis that it's something in the nature of a trade." According to the individual, the "exchange" ordinarily takes place without knowledge of the practitioner's client. The individual expressed the opinion that "exchanges" without knowledge of the client presently occur routinely. The PTO believes that the suggested "exchange" may ethically take place *only* when the practitioner's clients are fully advised of the exchange. Three other witnesses at the hearing expressed the view—correctly the PTO believes—that client knowledge is essential to an ethical exchange of the type contemplated. No change in §10.32 is being made.

A suggestion was received that "in matters before the Office" be inserted after "professional employment" in §10.33. The suggestion is not being adopted in view of the second sentence of §10.1. Another comment suggested that Rule 7.3 of the Model Rules of Professional Conduct (1983) be adopted in place of §10.33. The suggestion is not being adopted. Section 10.33 is based partly on Rule 7.3, but contains the additional language "under circumstances evidencing undue influence, intimidation, or overreaching." Section 10.33 is designed to prohibit so-called "ambulance chasing." In *Ohralik* v. *Ohio State Bar Ass'n.*, 436 U.S. 447 (1978), the Supreme Court held that a state could lawfully regulate ambulance chasing. In its opinion, the Supreme Court said:

> We need not discuss or evaluate each of these interests in detail as appellant has conceded that the State has a legitimate and indeed "compelling" interest in preventing those aspects of solicitation that involve fraud, undue influence, intimidation, overreaching, and other forms of 'vexatious conduct.' We agree that protection of the public from these aspects of solicitation is a legitimate and important state interest.

436 U.S. at 462. The additional language appearing in §10.33 is designed to limit the application of §10.33 to those situations in which the PTO has a legitimate interest. See also 35 U.S.C. 32 and §10.31(a).

A suggestion was received that §10.35(b) should be deleted. According to the suggestion, "[r]egulation of the practitioner's business arrangements should be left to state regulation." While the PTO is in general agreement with the rationale suggested, there exist partnerships of agents which are not subject to regulation by any state. Moreover, the commentator has not suggested or shown that §10.35(b) is inconsistent with the policy of any state. Practitioners should not be free to hold themselves out as being associated with a partnership or other organizations when an association does not in fact exist.

One comment suggested that "in the locality" be deleted from §10.36(b)(3). This suggestion is being

adopted, because "in the locality" has no particular significance in the practice of patent and trademark law. Clients of patent and trademark practitioners are not necessarily located where counsel are located. Moreover, the practice is national in scope.

An individual at the hearing suggested that the PTO should delete subparagraphs (1) and (2) from §10.37(a). This suggestion is not being adopted. The individual suggested that a client need not know that "employment" has been referred to another practitioner or to a foreign practitioner. The PTO disagrees and so did three other individuals who expressed a view at the hearing. Moreover, the PTO believes that when "farming out" occurs with the consent of a client, that the fee division should be proportional to the services rendered. Under §10.37, "farming out" of work without knowledge and consent of a client will constitute a disciplinary rule violation.

One commentator suggested that §10.39 "may result in numerous claims to the effect that a practitioner brought a proceeding 'merely for the purpose of harassing or maliciously injuring another person.' " Section 10.39 continues existing policy (37 CFR §1.344 and DR 2-109 of the ABA Code (1970)). Under existing policy, the PTO has not experienced "numerous claims." Accordingly, there is no reason to expect such claims under §10.39.

A suggestion was received that the first sentence of §10.40(a) be changed to read: "A practitioner may withdraw from employment in a proceeding before the Office without permission from the Commissioner in those instances in which a substitute has been selected and is willing to serve." This suggestion is not being adopted. If "a substitute has been selected and is willing to serve," presumably with the consent of the client, a new power of attorney may be filed in the PTO. Another commentator suggested that §10.40 should not apply to corporate attorneys. This suggestion likewise is not being adopted. If a corporate atorney changes jobs, the attorney should withdraw from representing the "old" corporation *or* the old corporation should revoke any power of attorney.

One comment suggested that the PTO should be under a burden of deciding requests for permission to withdraw within thirty (30) days. This suggestion is not being adopted, but it is and will continue to be PTO policy to promptly decide requests for permission to withdraw.

One comment suggested that ", and may not withdraw in other matters," be deleted from §10.40(c). This suggestion has been adopted.

One comment asked whether a power of attorney given during prosecution of a patent application continues to be viable after the patent is issued. The answer is "yes." Communications received during reexamination proceedings are sent to the correspondence address established during prosecution of the application which matures into the patent being reexamined. See 37 CFR §1.525. Notices concerning maintenance fees likewise are mailed to the correspondence address. See 37 CFR §1.363, 49 F.R. 34725 (Aug. 31, 1984). The commentator also raised a question of who is the client when a case is filed on behalf of an individual, but the individual's assignee pays the practitioner's bills. Practitioners are expected to know the identities of their clients. If a practitioner is hired by a corporation and wishes to make that fact plain on the record of a patent application, the practitioner may file an assignment and a power of attorney signed by the assignee. If a dispute should then occur between the individual and the assignee, the record would be clear that the assignee is the client.

A comment suggested that §10.40(a) "would appear to be unreasonable" in view of the language "giving due notice to another practitioner." Such language does not appear in §10.40(a).

An oral comment was received by phone which questioned whether the use of para-legals or apprentices by a practitioner constitutes the unauthorized practice of law. If a para-legal or apprentice works under the direction of a practitioner and the practitioner does not allow the para-legal or apprentice to hold themselves out as a practitioner, there is no unauthorized practice of law problem within the meaning of §10.47.

One comment discussing §10.49 made the following statement:

> ". . . if the intent of this section is to prohibit a practitioner from forming a partnership with a lawyer who, while in good standing with his State bar, does not qualify to practice before the Office (either because he has not taken the patent examination or is not qualified to handle trademark matters), then it should be stricken."

As explained in the notice of proposed rulemaking (49 F.R. 33797, column 3), the PTO does not intend to prohibit formation of law firms by members of the Bar of any state.

One comment suggested that "in matters before the Office" should be inserted after "employment" in §10.62(a). This suggestion is not being adopted in view of the second sentence of §10.1.

Another comment suggested that §§10.62 and 10.63 be replaced with Rule 3.7(b) of the Model Rules of Professional Conduct of the ABA (1983). For reasons already discussed, the PTO is not adopting the Model Rules. The comment went on to suggest that practitioners would not be free testify concerning attorney diligence in patent interference cases. The PTO has made it plain twice that it disagrees. See the advance notice (49 F.R. 10016, column 3 (Mar. 16, 1984)) and the notice of proposed rulemaking (49 F.R. 33797, column 3, last paragraph (Aug. 24, 1984)).

A comment suggested that language in §§10.62 and 10.63 is not clear. Specifically, the commentator referred to "solely to an uncontested matter" or "solely to a matter of formality." This language occurs in the current rules and has not caused any known difficulty.

Two comments were received which suggested that §10.64(b) should permit practitioners to pay fees which rightfully should be paid by a practitioner. This suggestion is being adopted and the following sentence has been added to §10.64(b): "A practitioner may, however, advance any fee required to prevent or remedy an abandonment of a client's application by reason of an act or omission attributable to the practitioner and not to the client, whether or not the client is ultimately liable for such fee." One of the commentators supplied the following rationale with which the PTO agrees:

> It sometimes happens that payment of a fee is necessitated by some act or omission for which the practitioner and not the client is responsible. One example is a fee for an extension of time to respond to an Office Action (see 37 C.F.R. §1.17 and §1.136), where the delay has resulted from the practitioner's workload for other clients, or from the practitioner's absence from his or her office for purposes unrelated to the client's business. Another example is a petition fee for revival of an application unintentionally abandoned through some inadvertent oversight on the practitioner's part. In these circumstances, it would seem unjust to require the client to bear the cost of the fee.

One comment suggested that §10.65 should be amended to indicate that it relates only to matters before the PTO. This suggestion is not being adopted in view of the second sentence of §10.1.

Another comment suggested that §10.65(a) "may limit a practitioner serving on the board of directors of a client." The commentator went on to say that practitioners serving on boards of directors is a common practice. Inasmuch as the client consents to practitioner serving on the board, it is believed that §10.65 does not limit a practitioner as suggested by the commentator.

One comment was received which suggested that §10.66(d) be changed to exclude corporate patent departments. According to the comment, "why should an entire corporate patent department have to withdraw if one of its members has to withdraw for disciplinary reasons?" In situations where it would not be appropriate for an entire firm or department to withdraw, §10.66(d)

permits the Commissioner or the Director to so order. See e.g., *Sunkist Growers, Inc.* v. *The Benjamin Ansehl Co.*, 221 USPQ 1077 (Comm'r.Pat. 1984). Another comment suggested that §10.66 should be amended to indicate that it relates only to matters before the PTO. This suggestion is not being adopted in view of the second sentence of §10.1.

One comment was received which suggested that §10.67 be amended to indicate that it relates only to matters before the PTO. This suggestion is not being adopted in view of the second sentence of §10.1.

A comment was received which suggested that §10.68(c) might be construed to preclude a practitioner from joining a law firm where attorneys who are not registered to practice before the PTO "are in control," i.e., are the "senior" partners. The definition of practitioner (see §10.1(r)) precludes such a construction, because any attorney in good standing in any State is a practitioner. Another comment suggested that §10.68 be amended to indicate that it relates only to matters before the PTO. This suggestion is not being adopted in view of the second sentence of §10.1.

One comment was made at the hearing which suggested that modifiers, such as "knowingly, willfully, intentionally," be inserted in §10.77. This suggestion is not being adopted. The PTO believes §10.77 states clearly the prohibited conduct.

A comment was received which suggested that §§10.77, 10.78, and 10.84 be amended to indicate that they refer only to matters before the PTO. This suggestion is not being adopted in view of the second sentence of §10.1.

One comment suggested that the term "unwarranted" in §10.85(a) (2) is "too vague as to its limits." The PTO disagrees. Contrary to the suggestion by the commentator, it is believed that practitioners can readily determine whether they are advocating a position that is unwarranted under existing law.

A comment was received which suggested that §10.85(b) can place a difficult burden on patent counsel. In support of his position, the commentator gave two examples and commented on both examples as follows:

Example 1: A client engages a patent attorney in the preparation of a patent application, and the patent attorney goes through the usual routine of advising the client of statutory bars, duty to disclose, etc. The attorney prepares and files the application, and during the course of the prosecution, the client informs the attorney of some activities that occurred a couple of years before filing the application, which activities might constitute an offer for sale. The attorney advises that this must be disclosed to the Patent Examiner, but the applicant refuses to follow this course of action and discharges the patent attorney. The client then engages another attorney to complete the prosecution, without telling the new attorney of the potentially damaging prior art.

Comment: In accordance with my interpretation of §10.85(b), the first attorney would be required to disclose this situation to the Office, unless the term "prepetrated a fraud" as it appears in that rule does not include the deliberate failure to disclose relevant prior art. My concern is that this could make for some very poor relationships with the client who might not understand the attorney's duty of disclosure before the Office.

Example 2: A rather poor inventor has managed to drum up enough money for the filing fee for a patent application and then proceeds to prepare and file his own patent application, without the assistance of a patent attorney. After a few months, the inventor obtains some financing from an investor, and the inventor and the investor consult the patent attorney to see if he would continue with the prosecution of the application. The attorney reviews the fact pattern and informs both the inventor and the investor that there is unquestionably some prior art, in the form of an earlier publication by the inventor, which must be disclosed before the Office. When the inventor and the investor find that the attorney intends to disclose this prior art as soon as he is engaged as their attorney, the inventor and the investor tell the attorney that they would rather engage the services of some other patent attorney, and that they will not tell the second attorney of the prior art.

Comment: As I would interpret §10.85 (b), the first patent attorney would be obliged to inform the Office of the relevant prior art. The first patent attorney would likely have the serial number and filing date of the application, and it would appear to me that the patent attorney would have to disclose not only the prior art, but also disclose the intent of the inventor and the investor not to disclose the same. This is pretty harsh treatment, and I can see where the inventor and the investor would have some very hard feelings against the patent attorney.

The PTO agrees that under the circumstances of Example 1, a "client . . . might not understand the attorney's duty of disclosure . . . " Likewise, the PTO can understand "where the inventor and the investor [in Example 2] would have some very hard feelings against the patent attorney." Nevertheless, the commentator has correctly noted in each case that the practitioner is required to advise the PTO. The practitioner's obligation under §10.85(b) has not been changed by the rules and is mandated by *Kingsland* v. *Dorsey*, 338 U.S. 318 (1949). See also Nahstoll, *The Lawyer's Allegiance: Priorities Regarding Confidentiality*, 41 Wash. & Lee L. Rev. 421 (1984).

A comment was received which suggested that §10.85 be amended to indicate that it pertains only to matters before the PTO. The suggestion is not being adopted in view of the second sentence of §10.1.

Two comments were received which suggested that §10.87(a) could be construed to prohibit a practitioner from recommending that a client meet with an opposing party for settlement discussions. Both comments suggested that §10.87(a) be amended to permit a practitioner to recommend that a client engage in settlement discussions directly with an opposing party. The suggestion is being adopted and the following sentence has been added to §10.87(a): "It is not improper, however, for a practitioner to encourage a client to meet with an opposing party for settlement discussions."

A suggestion was made that §10.87 be amended to indicate that it pertains only to matters before the PTO. The suggestion is not being adopted in view of the second sentence of §10.1.

One comment suggested that §10.89(c) (5) be "eliminated on the grounds of vagueness" because one cannot "be expected to comply with apparently unpublished customs of courtesy or practice." The suggestion is being adopted. Subparagraph (6) of §10.89(c) is being redesignated as subparagraph (5) and has also been changed to read: "Engage in undignified or discourteous conduct before the Office (see §1.3 of this Subchapter)." Subparagraph (7) has been redesignated as subparagraph (6).

Another comment discussing §10.89 asked "since when must counsel cite to the Examiner in *ex parte* proceedings cases known to be directly adverse to the position being advocated?" Counsel are expected to advise patent and trademark examiners of known controlling authority which is contrary to a position being advocated. It is important for counsel to do so in *ex parte* cases because there is no *advocate* taking a position contrary to the position being taken by an applicant. See also *Southern Pacific Transportation Co.* v. *Public Utilities Commission of the State of Calif.*, 716 F.2d 1285, 1291 (9th Cir. 1983).

A commentator contended that §10.89(a) "makes no sense" because a decision of the PTO may have been overruled by the Federal Circuit. Section 10.89(a) is limited to "a decision of the Office made in the course of a proceeding." Practitioners are expected to follow interlocutory orders entered in PTO proceedings. Obviously if such an order is ultimately overruled or reversed by a court, it no longer need be followed. The same commentator suggested that §10.89(c) (3) is not appropriate.

Specifically, the commentator indicated that practitioners often rely on the specification of a patent application and prior art. The specification and prior art are evidence, not the "practitioner's personal knowledge."

One commentator suggested that §§10.92 and 10.93 be amended to indicate that they relate solely to matters before the PTO. This suggestion is not being adopted in view of the second sentence of §10.1.

A commentator at the hearing suggested that §10.93 be changed to permit practitioners to discuss procedural matters with interlocutory examiners or members of the Board of Patent Interferences or the Trademark Trial and Appeal Board. In view of Public Law 98–622, November 8, 1984, the Board of Patent Interferences will cease to exist on February 8, 1985. All patent interference cases will be transfered to the Board of Patent Appeals and Interferences and will be assigned to an examiner-in-chief. Practitioners may consult an examiner-in-chief orally upon adequate notice to opposing counsel. A telephone conference call may be arranged when opposing counsel desires to participate in the oral consultation. The same is true of the interlocutory examiners or members of the Trademark Trial and Appeal Board. Questions of a purely procedural nature may be asked. However, an examiner-in-chief or the interlocutory examiner or member of the Trademark Trial and Appeal Board may nevertheless decline to answer procedural questions without opposing counsel being present or involved in a conference call.

One commentator suggested that §§10.101, 10.102, 10.103, and 10.111 be amended to indicate that they refer only to proceedings in the PTO. The suggestion is not being adopted in view of the second sentence of §10.1.

One comment suggested that practitioners residing in the United States should be able to maintain trust funds in a bank in any State. This suggestion is being adopted and §10.112(a) has been changed to implement the suggestion. However, if a State bar requires funds to be kept in a bank within the State, a practitioner would be required to keep funds in a bank in the State in order to comply with State rules. Another comment suggested that §10.112(c)(2) is not practical. According to the commentator, "invention samples and invention disclosures and drawings usually are the client's property, but keeping them in a safe deposit box is totally impractical." The commentator overlooks that portion of §10.112(c)(2) which reads "in a safe deposit box or other place of safekeeping . . . ." A client may consent to a practitioner keeping invention samples, invention disclosures, and drawings in the practitioner's office. The practitioner, of course, should see to it that the office is maintained with appropriate security.

An individual testified at the hearing that §10.112 is not clear. According to the individual, "I think the rules should specify that if you get money up front from a client, whether it's called a retainer, pre-payment, or whatever . . . that money has to be put into a trust fund or a trust account . . . and that you can't take the money out and spend it until you have performed the services and sent a bill to the client that says X dollars has come out of your trust account in payment of Y services." The PTO believes that §10.112(b)(2) specifies "that you can't take the money out and spent it until you have performed the services" and that §10.112(c)(3) specifies that you must send "a bill to the client." Accordingly, no change to §10.112 is necessary.

One commentator testified at the hearing that the PTO rules do not address "those individuals who, due to a mental or physical defect, are not able to bring themselves in conformity with the rules of conduct . . . ." On the contrary, §10.150 specifies that any practitioner shown to be "incompetent" may be suspended or excluded. The commentator at the hearing referred to an individual "who has a drinking problem or one who is mentally incapable of representing people before the . . . Office." The statute (35 U.S.C. 32) and the rules address such an individual. As noted in the advance notice, the PTO has declined to adopt the suggestion appearing in Manson, *Helping Lawyers Who Need Help (But Won't Ask for It!)*, 25 Va. Bar News 27 (June 1977). See 49 F.R. 10017, column 1 (Mar. 16, 1984). If an individual is suspended due to a drinking problem, reinstatement (see §10.160) may be conditioned on a clear and convincing showing that the drinking problem has been overcome.

One individual testified at the hearing that a "statute of limitations" should be inserted in §10.131. This suggestion is not being adopted. As the individual noted during testimony, statues of limitations do not apply in disciplinary proceedings.

A suggestion was received that §10.132 be changed to expressly provide that:

> No disposition adverse to the respondent shall be recommended by the Director until the respondent shall have been afforded the opportunity to be heard.

This suggestion is not being adopted. Section 10.132(a) provides that, where necessary, the Director shall comply with 5 U.S.C. 558(c) prior to calling a meeting of the Committee on Discipline. The relevant portion of 5 U.S.C. 558(c) provides:

> Except in cases of willfulness or those in which public health, interest, or safety required otherwise, the withdrawal, suspension, revocation, or annulment of a license is lawful only if, before the institution of agency proceedings therefor, the license has been given;
>
> (1) notice by the agency in writing of the facts or conduct which may warrant the action; and
>
> (2) opportunity to demonstrate or achieve compliance with all lawful requirements.

Where appropriate, a notice under §588(c) will be issued prior to the time the Director takes a case to the Committee on Discipline. Any reply to the §558 (c) notice will be reviewed by the Director and the Committee on Discipline prior to deciding whether a complaint should be filed.

Another suggestion was received which indicated that §10.132(c) should be changed so that the "accused practitioner . . . [would] have the right to select an administrative law judge from a panel of such judges, such panel including the names of at least two law judges." This suggestion is not being adopted. No rationale was given in support of the suggestion and there is no known reason to permit a respondent to select the particular administrative law judge (ALJ) to be assigned to hear the practitioner's case.

Several changes have been made in §10.133 by the PTO which are not in response to any comment or suggestion. The language "§§10.132(b) and 10.134" in the first sentence of §10.133(b) has been changed to §10.134". This change was made because a reference to §10.132(b) is not necessary. The language "his or her resignation by filing" in the first sentence of §10.133(b) has also been deleted as unnecessary. The second sentence of paragraph (b) of §10.133 has been replaced by new paragraphs (c) and (d). New paragraph (c) specifies the content of an affidavit of resignation filed prior to the date set by the ALJ for a hearing. New paragraph (d) specifies the content of an affidavit of resignation filed on or after the date set by the ALJ for a hearing. Old paragraph (c) has been redesignated as new paragraph (e) and the language "paragraph (b)" therein has been changed to read "paragraphs (b) and (c)". Old paragraphs (d) and (e) have been redesignated as new paragraphs (f) and (g), respectively.

New paragraph (c) of §10.133 has been added to define the conditions under which a practitioner may resign prior to the date set by the ALJ for a hearing. Experience has shown that practitioners do not readily resign prior to hearing if they are required to admit the charges against them and/or are required to admit that they could not have been defended against the charges or the subject of an investigation. Paragraph (c) does not require a practitioner to admit the charges or any lack of defense at the time of resignation. Rather, under §10.133(c)(5), any admission is operative at the time of a request for reinstatement and only for the *limited* pur-

pose of determining the request for reinstatement. By deferring the time when the practitioner makes the admissions, it is believed that settlements are more likely. Once a hearing begins, however, there is no reason to permit a resignation without admission of the facts and a lack of defense. The admissions of paragraph (c)(5) are relevant in determining whether reinstatement should be granted and whether sufficient time has passed between resignation and any application for reinstatement.

One comment was made at the hearing which suggested that "if, in fact there is a real stalemate in a settlement discussion, that there be some avenue so that there be, in essence, binding arbitration" on the part of the respondent and the Director. This suggestion is not being adopted. There is no reason to impose binding arbitration in disciplinary matters. While settlements are to be encouraged, if the parties (the respondent and the Director) cannot reach a mutually agreeable settlement, the proper recourse is to proceed with the disciplinary proceeding.

A suggestion was received that the second sentence of §10.138 be deleted. The suggestion is not being adopted. The second sentence of §10.138 provides that evidence obtained by a subpoena under 35 U.S.C. 24 will not be admitted unless prior approval was obtained from the ALJ to proceed under §24. This provision is necessary to retain control over the proceedings in the ALJ. Moreover, an order authorizing a party to proceed under §24 can be helpful to any district court which is required to determine whether an individual should be compelled to answer counsel's questions. Additional rationale in support of the PTO's decision not to adopt the suggestion appears in the advance notice (49 F.R. 10019, columns 1 and 2) and in the notice of proposed rulemaking (49 F.R. 33800, column 1).

Two individuals testified at the hearing concerning §10.144. Section 10.144 provides that hearings in disciplinary cases will not be open to the public. One individual suggested that hearings in disciplinary matters should be opened to the public. The other individual took the opposite position and supported §10.144 as proposed. The suggestion to open hearings to the public is not being adopted at this time. The PTO believes that a practitioner should not unnecessarily be exposed to charges of alleged wrongdoing until the practitioner is found to have violated the PTO Code of Professional Responsibility. Unnecessary and premature exposure could cause a practitioner's clients to find other counsel based on mere allegations. Additionally, the PTO is required to maintain information concerning patent applications in secrecy. 35 U.S.C. 122. In most disciplinary cases information concerning a patent application is revealed at any hearing. Accordingly, the PTO will not provide for public hearings. However, the PTO intends to further study the possibility of hearings open to the public (e.g., in a disciplinary proceeding involving only trademark matters) and may, in the future, propose to modify §10.144.

Numerous comments were received which suggested that the burden of proof set forth in §10.149 should be changed from "preponderance of evidence" to "clear and convincing evidence." As announced at the hearing, this suggestion is being adopted. The "clear and convincing evidence" standard brings §10.149 in conformance with §10.158(d)(1)(ii) which also requires proof by clear and convincing evidence.

The term "clear and convincing evidence" is not succeptable to a precise definition. The PTO, therefore, deems it appropriate to set forth its views on what constitutes "clear and convincing evidence." "Clear and convincing evidence" falls somewhere between proof beyond a reasonable doubt and proof by a preponderance of evidence.

A reasonable doubt is a doubt based upon reason and common sense—the kind of doubt that would make a reasonable person hesitate to act. Proof beyond a reasonable doubt must, therefore, be proof of such a convincing character that a person would be willing to rely and act upon it unhesitatingly in the most important of his or her affairs. Devitt, *Federal Jury Practice and Instructions* §11.01 (2d ed. 1970).

To establish a fact by a preponderance of evidence means to prove that fact is more likely so than not so. A preponderance of evidence means such evidence as, when considered and compared with that opposed to it, has more convincing force, and produces in the mind of the trier of fact a belief that what is sought to be proved is more likely true than not true. Devitt, *supra* at §7.01.

Clear and convincing evidence is that measure or degree of proof which will produce in the mind of the trier of fact a firm belief or conviction as to an allegation sought to be established; it is more than a preponderance of evidence, but less than that required to establish guilt beyond a reasonable doubt. *Hobson* v. *Eaton*, 399 F.2d 781 (6th Cir. 1968). It does not mean clear and unequivocal." *Fred C. Walker Agency, Inc.* v. *Lucas*, 215 Va. 535, 540–541, 211 S.E.2d 88, 92 (1975).

Several comments were received which suggested that §10.150 be changed to make the Federal Rules of Evidence applicable to disciplinary proceedings. The suggestion is not being adopted. The PTO has explained, in both the advance notice (49 F.R. 10020, column 2) and the notice of proposed rulemaking (49 F.R. 338001, columns 1 and 2) why it cannot adopt the Federal Rules of Evidence in disciplinary cases. The "Federal Rules of Evidence . . . do not apply to administrative proceedings . . . ." Davis, *Administrative Law Treatise*, §14.01 (Supp. 1970). The controlling law is set out in 5 U.S.C. 556(d) which provides in part: "Any oral or documentary evidence may be received, but the agency as a matter of policy shall provide for the exclusion of irrelevant, immaterial, or unduly repetitious evidence. A sanction may not be imposed or rule or order issued except on consideration of the whole record or those parts thereof cited by a party and supported by and in accordance with the reliable, probative, and substantial evidence." It appears to be the concern of some of the comments that the Administrative Procedure Act does not articulate an appropriate standard of evidence and that hearsay may be admitted. Suffice it to say that many adjudications occur daily under the Administrative Procedure Act, including disciplinary proceedings. The following language appearing in an opinion of the Eleventh Circuit in *TRW-United Greenfield Division* v. *National Labor Relations Board*, 716 F.2d 1391, 1394 (11th Cir. 1983), may be helpful:

> At the hearing the ALJ refused to allow five additional employees to testify that other employees told them that such a statement had been made. TRW contends it was denied a full and fair hearing by the exclusion of this testimony. The general rule is that administrative tribunals are not bound by the strict rules of evidence governing jury trials. *Opp Cotton Mills, Inc.* v. *Administrator of Wage & Hour Div.*, 312 U.S. 126, 155, 61 S.Ct. 524, 537, 85 L.Ed. 624 (1971). Thus, the admission of testimony which would be deemed incompetent in judicial proceedings would not invalidate the administrative order. *Tagg Bros. & Moorhead* v. *United States*, 280 U.S. 420, 442, 50 S.Ct. 220, 225, 74 L.Ed. 524 (1930). But this assurance of a desirable flexibility in administrative procedure does not go so far as to justify orders without a basis in evidence having rational probative force. Mere uncorroborated hearsay or rumor does not constitute substantial evidence. *Consolidated Edison Co.* v. *N.L.R.B.*, 305 U.S. 197, 230, 59 S.Ct. 206, 217, 83 L.Ed. 126 (1938). Therefore, the hearsay testimony of other employees would not have amounted to substantial evidence sufficient to support a finding for the company. We find that TRW was not denied a full and fair hearing by the judge's refusal to admit hearsay testimony.

See also *Steadman* v. *Securities and Exchange Commission*, 450 U.S. 91, 98 n. 17 (1981); *Richardson* v. *Perales*, 402 U.S. 389, 410–411 (1971); *Brown* v. *Gamage*, 377 F.2d 154, 158 (D.C.Cir.), *cert. denied*, 389 U.S. 858 (1967); Annotation, *Hearsay Evidence In Proceedings Before Federal Administrative Agencies*, 6 ALR Fed 76

(1971); and Davis, *Hearsay in Administrative Proceedings*, 32 Geo. Wash. L. Rev. 689 (1964).

A suggestion was received that §10.151 be changed to make the deposition rules of the Federal Rules of Civil Procedure applicable to disciplinary proceedings. This suggestion is not being adopted. The discovery provisions of the Federal Rules of Civil Procedure are not being adopted by the PTO in disciplinary cases. Except for discovery which the parties agree to make voluntarily, all discovery under these rules will require the prior permission of the ALJ. This prior permission is designed to insure that the ALJ retains control over the proceeding. By requiring prior approval of the ALJ to take a deposition, the rules insure that the deposition will relate to evidence the ALJ deems to be relevant and will afford the ALJ the option of determining whether he or she wishes to observe the witness.

Several comments were received which suggested that §10.152 be changed to permit more discovery. Some commentators urged adoption of the discovery provisions of the Federal Rules of Civil Procedure relating to requests for admissions, interrogatories, and requests for production of documents. Other commentators felt that the discovery proposed in the notice of proposed rulemaking was not sufficient and that more discovery should be authorized. These latter commentators, however, did not urge adoption of the discovery provisions of the Federal Rules of Civil Procedure. As one commentator noted:

> Disciplinary proceedings are not in the nature of civil actions and full discovery within the scope of the Federal Rules of Civil Procedure is probably not needed or desirable.

The PTO agrees that more discovery is appropriate than would have been authorized under §10.152 as proposed. The PTO does not agree, however, that discovery should be commensurate in scope with the discovery provisions of the Federal Rules of Civil Procedure.

One commentator at the hearing who urged adoption of the discovery provisions of the Federal Rules of Civil Procedure, correctly recognized the existence of "concerns of the Patent [and Trademark] Office regarding what are alleged to be general discovery abuses." There is ample basis for the PTO's concern. See e.g., Pollack, *Discovery—Its Abuse and Correction*, 80 F.R.D. 219 (1979) (reproducing remarks made by Judge Pollack at the Fifth Circuit Judicial Conference on April 26, 1978 at New Orleans). The same commentator at the hearing went on to note, however, that if the ALJ "gets on top of a case and monitors a case very actively, then no discovery abuses will occur, and if they do, they will be dealt with swiftly and properly."

Advocates of discovery "reform" seemingly rely on two principles which are claimed to be the cure-all for discovery abuse: (1) active control by the judge and (2) sanctions. See e.g. *Second Report of the Special Committee for the Study of Discovery Abuse*, 92 F.R.D. 137 (1980). The PTO is not in a position to impose the most effective sanction—costs. However, the PTO can invest the ALJ with control over discovery. It is because the PTO can invest the ALJ with control over discovery that the suggestion for more discovery is being adopted. Section 10.152 has been changed to permit discovery which the PTO believes will be effective. The scope of the discovery, however, will not be commensurate in scope with the Federal Rules of Civil Procedure.

Paragraph (a) of §10.152 will permit *limited* discovery *after* an answer is filed. Discovery is not authorized prior to the filing of an answer. A party seeking discovery will have to make out a clear and convincing case to the ALJ that discovery is necessary *and* relevant. If discovery is authorized, the ALJ may set conditions he or she deems appropriate to accomplish the discovery. For example, the ALJ may set the place and time for inspection of documents which are required to be produced or the ALJ can order a party to mail copies of the documents to the other party. Under paragraph (a) of §10.152, discovery is limited to a *reasonable* number of requests for admissions, interrogatories, or requests for production of documents and things. Consideration was given to setting numerical maximums for requests for admission, interrogatories and requests for production of documents and things. See e.g., Local Rule 11.1 of the U.S. District Court for the Eastern District of Virginia. However, numerical maximums are not presently specified. Should discovery become a problem, the PTO will give further consideration to limiting the number of discovery requests which a party may file.

Paragraph (b) of §10.152 specified certain matters which *cannot* be discovered. Matter which will be used by another party solely for impeachment or cross-examination cannot be discovered. Documents which will be used as part of the Director's case-in-chief or the respondent's case-in-rebuttal or affirmative defenses are subject to discovery. Patent applications not available to a respondent under 35 U.S.C. §122 are not subject to discovery. Matter relating to disciplinary proceedings commenced prior to the effective date of these rules is not available. For the most part, the reasons for a particular length of suspension or disbarment have not been stated in the past. Accordingly, disciplinary proceedings commenced prior to these rules are not particularly relevant. See *Poole* v. *United States*, 54 A.F.T.R. 2d (P-H) 84–5536 (D.D.C. June 29, 1984). Prior disciplinary proceedings which resulted in public discipline being imposed will continue to be available in the Office of the Director of Enrollment and Discipline. Respondents will continue to be free to inspect the files of those proceedings. Matters relating to experts, except as may be required by the ALJ under §10.152(e), likewise are not subject to discovery. Privileged matter and attorney work product are excluded from matter which can be discovered.

Paragraph (c) sets forth some factors the ALJ can consider in determining whether to authorize discovery or to limit discovery which is authorized. The factors include delay (which is a major consideration in disciplinary matters), burden on the party required to produce discovery, availability of the discovery sought to the public (in which case, discovery may not be necessary), the extent to which the matter sought to be discovered is equally available to both parties, and the extent to which discovery is available from another source.

Paragraph (d) of §10.152 requires a party desiring discovery to file a motion which explains, in detail, how each request is relevant to an issue raised in the complaint or the answer.

Paragraph (e) of §10.152 sets out matter which the ALJ can require a party to produce in a pre-hearing statement. Subparagraph (4) states the matter the ALJ can require disclosed related to experts.

The PTO has every reason to believe that the discovery authorized by §10.152 will be useful and that sufficient authority has been given to the ALJ to effectively control discovery and prevent abuses. The PTO intends to monitor discovery closely in the future and will consider amending these rules if abuses occur.

One comment suggested that §10.154(b) be modified by adding "any extenuating circumstances" as a matter to be considered in imposing a penalty. This suggestion is being adopted. Another comment suggested that §10.154 should address "probation." This suggestion is not being adopted. Nevertheless, the PTO has authority to place a practitioner on probation for all or a portion of any suspension and to revoke the probation upon a showing of a violation. See *In re Dula*, 1030 *Official Gazette* 20 (May 17, 1983).

One comment suggested that §10.155 be modified to specify that the Director should serve a copy of any appeal "on the respondent or on the attorney for respondent." This suggestion is not being adopted. However, in view of the suggestion the language "on the respondent" (both occurrences) in §10.155(a) is being deleted. Section 10.142(a) specifies how service is made on a respondent who is represented by an attorney.

A suggestion was received that §10.157 be modified to provide that a stay would be entered in every case where a respondent seeks judicial review of a decision

of the Commissioner. This suggestion was rejected at the time the notice of proposed rulemaking was published (49 F.R. 33802) and is not being adopted. There are cases where a stay is not appropriate, e.g., when the disbarred practitioner is incarcerated. There are other times when a stay may be appropriate. Accordingly, stays will be granted in the discretion of the Commissioner.

Several comments were received discussing §10.158. Some commentators suggested that §10.158 was "too lenient" and another suggested that it was "too hard" on suspended and excluded practitioners. Section 10.158 is designed to advise suspended practitioners as to what they can and cannot do during any period of suspension. The PTO believes that §10.158 strikes a reasonable balance in a difficult area. See the discussion concerning §10.158 in the advance notice (49 F.R. 10021, columns 2 and 3). One comment suggested that §10.158 should be made applicable to corporations. This suggestion is being adopted by appropriate changes in §10.158(c) to refer to client-employers. Another comment suggested that §10.158(b)(1) and (2) be changed to refer to matters before the PTO. This suggestion is also being adopted.

An oral comment was received asking whether the Director could conduct an investigation in connection with a determination under §10.158(d). The Director may conduct whatever investigation is warranted to determine whether a suspended or excluded practitioner seeking reinstatement has complied with regulations relating to suspended and excluded practitioners.

A comment was received regarding §10.159(a) which suggested that the Director notify the American Bar Association National Discipline Data Bank when a practitioner is suspended or excluded. This suggestion is not being adopted as such. However, §10.159(a) has been changed to authorize the Director to notify "any appropriate bar association." The PTO is not inclined to mention any particular bar association by name in the rules. It will be the practice of the PTO to notify the National Discipline Data Bank, among others, when a practitioner is disciplined. Another comment suggested that the entire file of a disciplinary proceeding should not be open to the public when only some, but not all, charges are sustained. This suggestion is not being adopted. In most disciplinary matters, it would be highly inconvenient to segregate the relevant from the irrelevant. Moreover, once discipline is imposed, the principal rationale for keeping the file secret no longer exists. The disciplined practitioner will suffer whatever public embarassment results from discipline apart from whether part or all of the file is open to the public.

With respect to §10.160, one commentator suggested that the burden on the suspended or excluded practitioner for reinstatmnent be stated in the rules. This suggestion is being adopted and a "clear and convincing showing" requirement has been added to §10.160(c). Section 10.149 sets out the burden on the Director for proof of allegations in the complaint and upon the respondent for proving affirmative defenses. The showing required by §10.158(d)(1) is by "clear and convincing evidence." One commentator suggested that the 5-year period of §10.160(b) should be changed to a 3-year period. This suggestion is not being adopted. According to the commentator, the PTO has failed to state why a 5-year period was proposed. The commentator believes a 3-year period is more appropriate, although no reason is given in support of the commentator's belief. The PTO, after considering the matter, has concluded that some period must be specified and there is no reason to change the 5-year period proposed. A commentator suggested that a practitioner suspended for less than six months should "automatically" be reinstated. This suggestion is not being adopted, because the Director, as a condition to any reinstatement, must find that the suspended practitioner complied with §10.158. Another commentator questioned whether the rules should provide for application for reinstatement during a period of probation. The PTO believes the rules need not make provision for application for reinstatement during probation. For example, if a practitioner is suspended for a period of three years and it is ordered that the practitioner be actually suspended for at least one year *and* that the last two years the practitioner be placed on probation, the practitioner would be able to apply for reinstatement after serving one year of the three year suspension.

The PTO disagrees with the following comment concerning§10.161(b). "This clause is ex post facto legislation as it seeks retroactively an increase of penalties regarding conduct which occurred prior to the legislation." No legislation is involved. Section 10.161(b) does not "increase penalties."

Table 1
Principal Source of Sections 10.2 through 10.19

Sec.	
10.1 (preamble)	35 USC 31; *Sperry* v. *Florida,* 373 U.S. 379, 402 (1963)
10.1	35 USC 25; 28 USC 1746
10.1(c)	5 USC 500(b)
10.1(q)	1 USC 1
10.1(aa)	35 USC 100(c)
10.2(a)	New
10.2(b) (1)	New, but see 37 CFR 1.341(i) (1983)
10.2(b) (2)	New, but see 37 CFR 1.348(a) (1983)
10.2(c)	New, but see 37 CFR 1.341(i) (1983)
10.3	37 CFR 1.341(i) (1983)
10.4(a)	New
10.4(b)	New, but see 37 CFR 1.348(a) (1983)
10.4(c)	New
10.5	37 CFR 1.341 (1983)
10.6(a)	37 CFR 1.341(a) (1983)
10.6(b)	37 CFR 1.341(b) (1983)
10.6(c)	37 CFR 1.341(e) (1983)
10.6(d)	37 CFR 1.341(f) (1983)
10.6(e)	37 CFR 1.341(g) (1983)
10.7(a), (b)	37 CFR 1.341(c) (1983)
10.7(c)	New
10.8	37 CFR 1.341(h) (1983)
10.9(a)	37 CFR 1.342 (1983)
10.9(b)	New
10.10	37 CFR 1.343 (1983)
10.11	37 CFR 1.347 (1983)
10.12	[reserved]
10.13	[reserved]
10.14	5 USC 500(b) and 37 CFR 2.12 (1983)
10.15	35 USC 32; 5 USC 500(d) (2); 37 CFR 1.343 (1983); and 37 CFR 2.12(f) (1983)
10.16	[reserved]
10.17	[reserved]
10.18(a)	37 CFR 1.346 (1983) and 37 CFR 2.15 (1983), see also Rule 11, FRCP
10.18(b)	35 USC 32 & Rule 11, FRCP
10.19	[reserved]

Table 2
Principle Source of Sections of 10.20 through 10.112, the PTO Code of Professional Responsibility

Abbreviations:
FRCP means Federal Rules of Civil Procedure
MCPR means Model Code of Professional Responsibility of the ABA (1980)
MRPC means Model Rules of Professional Conduct of the ABA (1983)
VCPR means the Virginia Code of Professional Responsibility (1984)

Sec.	
10.20	Preamble to MCPR (1980)
10.21	MCPR Canon 1 (1980)
10.22	MCPR DR 1-101 (1980)
10.23(a)	35 U.S.C. 32
10.23(b) (1)	35 U.S.C. 32 and MCPR DR 1-102(A) (1) (1980)

Table 2 (Cont'd)	
10.23(b) (2)–(6)	MCPR DR 1–102(A) (2)–(6) (1980)
10.23(c) (1)–(14)	PTO created
10.23(c) (15)	Rule 11, FRCP
10.23(c) (16)–(18)	PTO created
10.23(d)	*U.S.* v. *Beecroft*, 608 F.2d 753 (9th Cir. 1979)
10.24	MCPR 1–103 (1980)
10.25 through 10.29	(reserved)
10.30	MCPR Canon 2 (1980)
10.31(a)	35 U.S.C. 32
10.31(b)	5 U.S.C. 501
10.31(c)	37 CFR 1.345(c) (1983)
10.31(d)	Newly created
10.32	MRPC Rule 7.2 (1983)
10.33	MRPC Rule 7.3 (1983)
10.34	MRPC Rule 7.4 (1983)
10.35(a)	5 U.S.C. 501 and MRPC Rule 7.5 (1983)
10.35(b)	MRPC Rule 7.5 (1983)
10.36	MCPR DR 2–106 (1980)
10.37	MCPR DR 2–107 (1980)
10.38	MCPR DR 2–108 (1980)
10.39	MCPR DR 2–109 (1980)
10.40	MCPR DR 2–110 (1980)
10.41 through 10.45	(reserved)
10.46	MCPR Canon 3 (1980)
10.47(a), (c)	MCPR DR 3–101 (1980)
10.47(b)	New (but see e.g., *Crawford* v. *State Bar of California*, 7 Cal. Rptr. 746, 355 P.2d 490 (Cal. 1960))
10.48	MCPR DR 3–102 (1980)
10.49	MCPR DR 3–103 (1980)
10.50 through 10.55	(reserved)
10.56	MCPR Canon 4 (1980)
10.57	MCPR DR 4–101 (1980)
10.58 through 10.60	(reserved)
10.61	MCPR Canon 5 (1980)
10.62	MCPR DR 5–101 (1980)
10.63	MCPR DR 5–102 (1980)
10.64	MCPR DR 5–103 (1980)
10.65	MCPR DR 5–104 (1980)
10.66	MCPR DR 5–105 (1980)
10.67	MCPR DR 5–106 (1980)
10.68	MCPR DR 5–107 (1980)
10.69 through 10.75	(reserved)
10.76	MCPR Canon 6 (1980)
10.77	MCPR DR 6–101 (1980)
10.78	MCPR DR 6–102 (1980)
10.79 through 10.82	(reserved)
10.83	MCPR Canon 7 (1980)
10.84	MCPR DR 7–101 (1980)
10.85	MCPR DR 7–102 (1980)
10.86	(reserved)
10.87	MCPR DR 7–104 (1980)
10.88	MCPR DR 7–105 (1980)
10.89	MCPR DR 7–106 (1980)
10.90	(reserved)
10.91	(reserved)
10.92	MCPR DR 7–109 (1980)
10.93	VCPR DR 7–109 (1984)
10.94 through 10.99	(reserved)
10.100	MCPR Canon 8 (1980)
10.101(a)	MCPR DR 8–101 (1980)
10.101(b)	37 CFR 1.341(f) (1983) and 41 Cp. Att'y Gen. 21 (1949), *reprinted in* 1949 Dec. Comm'r Pat. 1
10.102	MCPR DR 8–102 (1980)
10.103	MCPR DR 8–103 (1980)
10.104 through 10.109	(reserved)
10.110	MCPR Canon 9 (1980)
10.111	MCPR DR 9–101 (1980)
10.112	MCPR DR 9–102 (1980)

Table 3
Principal Source of Sections 10.130 through 10.161

Section	*Source*
10.130	35 U.S.C. 32
10.131(a)	New, but see 37 CFR 1.348(a)
10.131(b)	MCPR DR 1–103 (1980)
10.131(c)	New
10.132(a), (c)	New
10.132(b)	New, but see 37 CFR 1.348(b) (1983)
10.133	New
10.134	37 CFR 1.348(b) (1983)
10.135(a) (1)	New
10.135(a) (2)	37 CFR 1.348(b) (1983)
10.135(a) (3)	New
10.135(b)	New
10.135(c)	New
10.135(d)	5 USC 500(f)
10.136(a)	37 CFR 1.348(c) (1983)
10.136(b)	New
10.136(c)	37 CFR 1.348(c) (1983)
10.136(d)	37 CFR 1.348(c) (1983)
10.136(e)	New
10.137	37 CFR 1.348(c) (1983)
10.138	New
10.139(a)	5 USC 3105
10.139(b)	5 USC 556(c)
10.139(c)	New
10.139(d)	New
10.139(e)	New
10.140(a)	5 USC 500(b)
10.140(b)	New
10.141	New
10.142	New
10.143	New
10.144	New
10.145	New
10.146–10.148	[reserved]
10.149	New
10.150(a)	5 USC 556(d)
10.150(b)	37 CFR 1.348 (d) (3) (1983)
10.150(c)	New
10.150(d)	New
10.150(e)	New
10.151	37 CFR 1.348(d) (3) (1983)
10.152	New, see *Silverman* v. *CFTC*, 549 F.2d 28 (7th Cir. 1977)
10.153	New, but see 5 USC 557(c)
10.154	See 5 USC 557(b) and 35 USC 32
10.155	New
10.156	New
10.157	35 USC 32, Local Rule 1–26 (D.D.C.)
10.158	New
10.159	New
10.160	New
10.161	New
10.162–10.169	[reserved]
10.170	New, but see 37 CFR 1.183

Other Considerations: The rules will not have a significant impact on the quality of the human environment or the conservation of energy resources.

The rules are in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96–354) and Executive Order 12291.

The General Counsel of the Department of Commerce has certified to the Small Business Administration that the rules will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96–354). The rules regulate the conduct of attorneys and agents who represent individuals and juristic entities before the Patent and Trademark Office and would not be expected to result in an increase of fees charged by attorneys and agents to entities, including small entities.

The Patent and Trademark Office has determined that the rules are not a major rule under 'Executive Order 12291. The annual effect on the economy will be less than $100 million. There will be no major increase in costs or prices for consumers, individual industries, federal, state, or local government agencies, or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of the United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The information reporting requirements contained in the rules have been approved by the Office of Management and Budget, OMB Control No. 0651-0012 and OMB Control No. 0651-0017.

List of Subjects in 37 CFR Parts 1, 2 and 10.

Administrative practice and procedure, Authority delegations, Conflict of interests, Courts, Inventions and patents, Trademarks, Lawyers.

For the reasons given in the preamble and under the authority granted to the Commissioner of Patents and Trademarks by 5 U.S.C. 500; 15 U.S.C. 1123; and 35 U.S.C. 6, 31, 32, and 41. Parts 1, 2, and 10 of Title 37 of the Code of Federal Regulations are amended as set forth below:

Part 1—Rules of Practice in Patent Cases

1. Section 1.8 is amended by adding to paragraph (a)(12) a new subparagraph (xiii) to read as follows:

§1.8 Certificate of mailing.

(a) * * *

(2) * * *

(xiii) Papers filed in connection with a disciplinary proceeding under Part 10 of this Subchapter.

2. Section 1.21 is amended by adding to paragraph (a) two new subparagraphs (5) and (6) to read as follows:

§1.21 Miscellaneous fees and charges.

(a) * * *

(5) For review of a decision of the Director of Enrollment and Discipline under §10.2(c) 60.00

(6) For requesting regrading of an examination under §10.7(c) 60.00

* * * * *

3. Section 1.31 is revised to read as follows:

§1.31 Applicants may be represented by a registered attorney or agent.

An applicant for patent may file and prosecute his or her own case, or he or she may be represented by a registered attorney, registered agent, or other individual authorized to practice before the Patent and Trademark Office in patent cases. See §§10.6 and 10.9 of this Subchapter. The Patent and Trademark Office cannot aid in the selection of a registered attorney or agent.

4. Section 1.33 is amended by removing from paragraph (c) "1.341 and 1.347" and inserting in its place "10.5 and 10.11".

5. Section 1.34 is amended by revising paragraph (a) as follows:

§1.34 Recognition for representation.

(a) When a registered attorney or agent acting in a representative capacity appears in person or signs a paper in practice before the Patent and Trademark Office in a patent case, his or her personal appearance or signature shall constitute a representation to the Patent and Trademark Office that under the provisions of this Subchapter and the law, he or she is authorized to represent the particular party in whose behalf he or she acts. In filing such a paper, the registered attorney or agent should specify his or her registration number with his or her signature. Further proof of authority to act in a representative capacity may be required.

* * * * *

6. Section 1.56 is amended by removing from paragraphs (f) and (h) "1.346" and inserting in its place "10.18".

7. The center heading preceding §1.341 is removed.

8. Sections 1.341 through 1.348 are removed.

9. Section 1.455 is amended by removing from paragraph (a) "1.341" and inserting in its place "10.10".

Part 2—Rules of Practice in Trademark Cases

10. Section 2.11 is revised to read as follows:

§2.11 Applicants may be represented by an attorney.

The owner of a trademark may file and prosecute his or her own application for registration of such trademark, or he or she may be represented by an attorney or other individual authorized to practice in trademark cases under §10.14 of this Subchapter. The Patent and Trademark Office cannot aid in the selection of an attorney or other representative.

11. Sections 2.12 through 2.16 are removed.

12. Section 2.17 is amended by revising paragraph (a) as follows:

§2.17 Recognition for representation.

(a) When an attorney as defined in §10.1(c) of this Subchapter acting in a representative capacity appears in person or signs a paper in practice before the Patent and Trademark Office in a trademark case, his or her personal appearance or signature shall constitute a representation to the Patent and Trademark Office that, under the provisions of §10.14 and the law he or she is authorized to represent the particular party in whose behalf he or she acts. Further proof of authority to act in a representative capacity may be required.

* * * * *

13. Section 2.19 is revised to read as follows:

§2.19 Revocation of power of attorney or of other authorization to represent, withdrawal.

(a) Authority to represent an applicant or a party to a proceeding may be revoked at any stage in the proceedings of a case upon notification to the Commissioner; and when it is so revoked, the Office will communicate directly with the applicant or party to the proceeding or with such other qualified person as may be authorized. The Patent and Trademark Office will notify the person affected of the revocation of his or her authorization.

(b) An individual authorized to represent an applicant or party in a trademark case may withdraw upon application to and approval by the Commissioner.

14. The following Part 10 is added:

Part 10–Representation of others before the Patent and Trademark Office

Sec.

10.1	Definitions
10.2	Director of Enrollment and Discipline
10.3	Committee on Enrollment
10.4	Committee on Discipline
	Individuals Entitled to Practice Before the Patent and Trademark Office
10.5	Register of attorneys and agents in patent cases
10.6	Registration of attorneys and agents
10.7	Requirements for registration
10.8	Oath and registration fee
10.9	Limited recognition in patent cases
10.10	Individuals not registered or recognized to practice in patent cases
10.11	Removing names from the register
10.12–10.13	[reserved]
10.14	Individuals who may practice before the Office in trademark and other non-patent cases
10.15	Refusal to recognize a practitioner
10.16–10.17	[reserved]
10.18	Signature and certificate of practitioner
10.19	[reserved]
	Patent and Trademark Office Code of Professional Responsibility
10.20	Canons and Disciplinary Rules
10.21	Canon 1
10.22	Maintaining integrity and competence of the legal profession

10.23 Misconduct
10.24 Disclosure of information to authorities
10.25–10.29 [reserved]
10.30 Canon 2
10.31 Communications concerning a practitioner's services
10.32 Advertising
10.33 Direct contact with prospective clients
10.34 Communication of fields of practice
10.35 Firm names and letterheads
10.36 Fees for legal services
10.37 Division of fees among practitioners
10.38 Agreements restricting the practice of a practitioner
10.39 Acceptance of employment
10.40 Withdrawal from employment
10.41–10.45 [reserved]
10.46 Canon 3
10.47 Aiding unauthorized practice of law
10.48 Sharing legal fees
10.49 Forming a partnership with a nonpractitioner
10.50–10.55 [reserved]
10.56 Canon 4
10.57 Preservation of confidences and secrets of a client
10.58–10.60 [reserved]
10.61 Canon 5
10.62 Refusing employment when the interest of the practitioner may impair the practitioner's independent professional judgment
10.63 Withdrawal when the practitioner becomes a witness
10.64 Avoiding acquisition of interest in litigation or proceeding before the Office
10.65 Limiting business relations with a client
10.66 Refusing to accept or continue employment if the interests of another client may impair the independent professional judgment of the practitioner
10.67 Settling similar claims of clients
10.68 Avoiding influence by others than the client
10.69–10.75 [reserved]
10.76 Canon 6
10.77 Failing to act competently
10.78 Limiting liability to client
10.79–10.82 [reserved]
10.83 Canon 7
10.84 Representing a client zealously
10.85 Representing a client within the bounds of the law
10.86 [reserved]
10.87 Communicating with one of adverse interest
10.88 Threatening criminal prosecution
10.89 Conduct in proceedings
10.90–10.91 [reserved]
10.92 Contact with witnesses
10.93 Contact with officials
10.94–10.99 [reserved]
10.100 Canon 8
10.101 Action as a public official
10.102 Statements concerning officials
10.103 Practitioner candidate for judicial office
10.104–10.109 [reserved]
10.110 Canon 9
10.111 Avoiding even the appearance of impropriety
10.112 Preserving identity of funds and property of client
10.113–10.129 [reserved]

Investigations and Disciplinary Procedures

10.130 Reprimand, suspension or exclusion
10.131 Investigations
10.132 Initiating a disciplinary proceeding; reference to an administrative law judge
10.133 Conference between Director and practitioner; resignation
10.134 Complaint
10.135 Service of complaint
10.136 Answer to complaint
10.137 Supplemental complaint
10.138 Contested case
10.139 Administrative law judge; appointment; responsibilities; review of interlocutory orders; stays
10.140 Representative for Director or respondent
10.141 Filing of papers
10.142 Service of papers
10.143 Motions
10.144 Hearings
10.145 Proof; variance; amendment of pleadings
10.146–10.148 [reserved]
10.149 Burden of proof
10.150 Evidence
10.151 Depositions
10.152 Discovery
10.153 Proposed findings and conclusions; post-hearing memorandum
10.154 Initial decisions of administrative law judge
10.155 Appeal to the Commissioner
10.156 Decision of the Commissioner
10.157 Review of Commissioner's final decision
10.158 Suspended or excluded practitioner
10.159 Notice of suspension or exclusion
10.160 Petition for reinstatement
10.161 Savings clause
10.162–10.169 [reserved]
10.170 Suspension of rules

Authority: 5 U.S.C. 500: 15 U.S.C. 1123; 35 U.S.C. 6, 31, 32, 41

Part 10—Representation of others before the Patent and Trademark Office

§10.1 Definitions.

This part governs solely the practice of patent, trademark, and other law before the Patent and Trademark Office. Nothing in this part shall be construed to preempt the authority of each State to regulate the practice of law, except to the extent necessary for the Patent and Trademark Office to accomplish its federal objectives. Unless otherwise clear from the context, the following definitions apply to this part:

(a) "Affidavit" means affidavit, declaration under 35 U.S.C. 25 (see §1.68 and §2.20 of this Subchapter), or statutory declaration under 28 U.S.C. 1746.

(b) "Application" includes an application for a design, plant, or utility patent, an application to reissue any patent, and an application to register a trademark.

(c) "Attorney" or "lawyer" means an individual who is a member in good standing of the bar of any United States court or the highest court of any State. A "nonlawyer" is a person who is not an attorney or lawyer.

(d) "Canon" is defined in §10.20(a).

(e) "Confidence" is defined in §10.57(a).

(f) "Differing interests" include every interest that may adversely affect either the judgment or the loyalty of a practitioner to a client, whether it be a conflicting, inconsistent, diverse, or other interest.

(g) "Director" means the Director of Enrollment and Discipline.

(h) "Disciplinary Rule" is defined in §10.20(b).

(i) "Employee of a tribunal" includes all employees of

courts, the Office, and other adjudicatory bodies.

(j) "Giving information" within the meaning of §10.23(c)(2) includes making (1) a written statement or representation or (2) an oral statement or representation.

(k) "Law firm" includes a professional legal corporation or a partnership.

(l) "Legal counsel" means practitioner.

(m) "Legal profession" includes the individuals who are lawfully engaged in practice of patent, trademark, and other law before the Office.

(n) "Legal service" means any legal service which may lawfully be performed by a practitioner before the Office.

(o) "Legal System" includes the Office and courts and adjudicatory bodies which review matters on which the Office has acted.

(p) "Office" means Patent and Trademark Office.

(q) "Person" includes a corporation, an association, a trust, a partnership, and any other organization or legal entity.

(r) "Practitioner" means (1) an attorney or agent registered to practice before the Office in patent cases or (2) an individual authorized under 5 U.S.C. 500(b) or otherwise as provided by this Subchapter, to practice before the Office in trademark cases or other non-patent cases. A "suspended or excluded practitioner" is a practitioner who is suspended or excluded under §10.156. A "non-practitioner" is an individual who is not a practitioner.

(s) A "proceeding before the Office" includes an application, a reexamination, a protest, a public use proceeding, a patent interference, an *inter partes* trademark proceeding, or any other proceeding which is pending before the Office.

(t) "Professional legal corporation" means a corporation authorized by law to practice law for profit.

(u) "Registration" means registration to practice before the Office in patent cases.

(v) "Respondent" is defined in §10.134(a)(1).

(w) "Secret" is defined in §10.57(a).

(x) "Solicit" is defined in §10.33.

(y) "State" includes the District of Columbia, Puerto Rico, and other federal territories and possessions.

(z) "Tribunal" includes courts, the Office, and other adjudicatory bodies.

(aa) "United States" means the United States of America, its territories and possessions.

§10.2 Director of Enrollment and Discipline.

(a) *Appointment.* The Commissioner shall appoint a Director of Enrollment and Discipline. In the event of the absence of the Director or a vacancy in the office of the Director, the Commissioner may designate an employee of the Office to serve as acting Director of Enrollment and Discipline. The Director and any acting Director shall be an active member in good standing of the bar of a State.

(b) *Duties.* The Director shall:

(1) Receive and act upon applications for registration, prepare and grade the examination provided for in §10.7(b), maintain the register provided for in §10.5, and perform such other duties in connection with enrollment and recognition of attorneys and agents as may be necessary.

(2) Conduct investigations into possible violations by practitioners of Disciplinary Rules, with the consent of the Committee on Discipline initiate disciplinary proceedings under §10.132(b), and perform such other duties in connection with investigations and disciplinary proceedings as may be necessary.

(c) *Review of Director's decision.* Any final decision of the Director refusing to register an individual under §10.6, recognize an individual under §§10.9 or 10.14(c), or reinstate a suspended or excluded petitioner under §10.160, may be reviewed by petition to the Commissioner upon payment of the fee set forth in §1.21(a)(5). A petition filed more than 30 days after the date of the decision of the Director may be dismissed as untimely. Any petition shall contain (1) a statement of the facts involved and the points to be reviewed and (2) the action requested. Briefs or memoranda, if any, in support of the petition shall accompany or be embodied therein. The petition will be decided on the basis of the record made before the Director and no new evidence will be considered by the Commissioner in deciding the petition. Copies of documents already of record before the Director shall not be submitted with the petition. An oral hearing on the petition will not be granted except when considered necessary by the Commissioner.

(OMB Control No. 0651–0012).

§10.3 Committee on Enrollment.

(a) The Commissioner may establish a Committee on Enrollment composed of one or more employees of the Office.

(b) The Committee on Enrollment shall, as necessary, advise the Director in connection with the Director's duties under §10.2(b)(1).

§10.4 Committee on Discipline.

(a) The Commissioner shall appoint a Committee on Discipline. The Committee on Discipline shall consist of the at least three employees of the Office, none of whom reports directly or indirectly to the Director or the Solicitor. Each member of the Committee on Discipline shall be a member in good standing of the bar of a State.

(b) The Committee on Discipline shall meet at the request of the Director and after reviewing evidence presented by the Director shall, by majority vote, determine whether there is probable cause to bring charges under §10.132 against a practitioner. When charges are brought against a practitioner, no member of the Committee on Discipline, employee under the direction of the Director, or associate solicitor or assistant solicitor in the Office of the Solicitor shall participate in rendering a decision on the charges.

(c) No discovery shall be authorized of, and no member of the Committee on Discipline shall be required to testify about, deliberations of the Committee on Discipline.

Individuals Entitled to Practice Before the Patent and Trademark Office

§10.5 Register of attorneys and agents in patent cases.

A register of attorneys and agents is kept in the Office on which are entered the names of all individuals recognized as entitled to represent applicants before the Office in the preparation and prosecution of applications for patent. Registration in the Office under provisions of this part shall only entitle the individuals registered to practice before the Office in patent cases.

§10.6 Registration of attorneys and agents.

(a) *Attorneys.* Any citizen of the United States who is an attorney and who fulfills the requirements of this part may be registered as a patent attorney to practice before the Office. When appropriate, any alien who is an attorney, who lawfully resides in the United States, and who fulfills the requirements of this part may be registered as a patent attorney to practice before the Office, *provided:* registration is not inconsistent with the terms upon which the alien was admitted to, and resides in, the United States and *further provided:* the alien may remain registered only (1) if the alien continues to lawfully reside in the United States and registation does not become inconsistent with the terms upon which the alien continues to lawfully reside in the United States or (2) if the alien ceases to reside in the United States, the alien is qualified to be registered under paragraph (c) of this section. See also §10.9(b).

(b) *Agents.* Any citizen of the United States who is not an attorney and who fulfills the requirements of this part may be registered as a patent agent to practice before the Office. When appropriate, any alien who is not an attorney, who lawfully resides in the United States, and who fulfills the requirements of this part may be registered as a patent agent to practice before the Office, *provided:* registration is not inconsistent with the terms upon which the alien was admitted to, and resides in, the United States, and *further provided:* the alien may re-

main registered only (1) if the alien continues to lawfully reside in the United States and registration does not become inconsistent with the terms upon which the alien continues to lawfully reside in the United States or (2) if the alien ceases to reside in the United States, the alien is qualified to be registered under paragraph (c) of this section. See also §10.9(b).

Note: All individuals registered prior to Nov. 15, 1938, were registered as attorneys, whether they were attorneys or not, and such registrations have not been changed.

(c) *Foreigners.* Any foreigner not a resident of the United States who shall file proof to the satisfaction of the Director that he or she is registered and in good standing before the patent office of the country in which he or she resides and practices and who is possessed of the qualifications stated in §10.7, may be registered as a patent agent to practice before the Office for the limited purpose of presenting and prosecuting patent applications of applicants located in such country, *provided:* the patent office of such country allows substantially reciprocal privileges to those admitted to practice before the United States Patent and Trademark Office. Registration as a patent agent under this paragraph shall continue only during the period that the conditions specified in this paragraph obtain.

(d) *Government employees.* Any officer or employee of the United States who is disqualified by statute (18 U.S.C. 203, 205) from practicing as an attorney or agent in proceedings or other matters before Government departments or agencies, may not be registered to practice before the Office. If any registered attorney or agent becomes an officer or employee of the United States who is disqualified by statute from practicing as an attorney or agent in proceedings and other matters before Government departments or agencies, his or her name shall be endorsed as inactive on the register during the period of any employment by the United States. An officer or employee of the United States whose official duties require the preparation and prosecution of applications for patent and who fulfills the requirements of this part may be registered to practice before the Office to the extent necessary to carry out his or her official duties. A written statement describing the official duties of the officer or employee and signed on behalf of the agency employing the officer or employee may be required by the Director.

(e) *Former Office employees.* No individual who has served in the Office will be registered after termination of his or her services, nor if registered before such service, be reinstated, unless he or she signs a written statement indicating that he or she has read 18 U.S.C. 207. No individual who has served in the patent examining corps of the Office will be registered after termination of his or her services, nor if registered before such service, be reinstated, unless he or she signs a written undertaking (1) not to prosecute or aid in any manner in the prosecution of any patent application pending in any patent examining group during his or her period of service therein and (2) not to prepare or prosecute or to assist in any manner in the preparation or prosecution of any patent application of another (i) assigned to such group for examination and (ii) filed within two years after the date he or she left such group, without written authorization of the Director. Associated and related classes in other patent examining groups may be required to be included in the undertaking or designated classes may be excluded from the undertaking. When an application for registration or reinstatement is made after resignation from the Office, the applicant will not be registered or reinstated if he or she has prepared or prosecuted or assisted in the preparation or prosecution of any patent application as indicated in this paragraph.

(OMB Control No. 0651–0012)

§10.7 Requirements for registration.

(a) No individual will be registered to practice before the Office unless he or she shall:

(1) apply to the Commissioner in writing on a form supplied by the Director and furnish all requested information and material and

(2) establish to the satisfaction of the Director that he or she is:

(i) of good moral character and repute;

(ii) possessed of the legal, scientific, and technical qualifications necessary to enable him or her to render applicants for patents valuable service; and

(iii) is otherwise competent to advise and assist applicants for patents in the presentation and prosecution of their applications before the Office.

(b) In order that the Director may determine whether an individual seeking to have his or her name placed upon the register has the qualifications specified in paragraph (a) of this section, satisfactory proof of good moral character and repute and of sufficient basic training in scientific and technical matters must be submitted to the Director. Except as provided in this paragraph, each applicant for registration must take and pass an examination which is held from time to time. Each application for admission to take the examination for registration must be accompanied by the fee set forth in §1.21(a)(1) of this Subchapter. The taking of an examination may be waived in the case of any individual who has actively served for at least four years in the patent examining corps of the Office. The examination will not be administered as a mere academic exercise.

(c) Within two months from the date an applicant is notified that he or she failed an examination, the applicant may request regrading of the examination upon payment of the fee set forth in §1.21(a)(6). Any applicant requesting regrading shall particularly point out the errors which the applicant believed occurred in the grading of his or her examination.

(OMB Control No. 0651–0012)

§10.8 Oath and registration fee.

Before an individual may have his or her name entered on the register of attorneys and agents, the individual must, after his or her application is approved, subscribe and swear to an oath or make a declaration prescribed by the Commissioner and pay the registration fee set forth in §1.21(a)(2) of this Subchapter.

(OMB Control No. 0651–0012)

§10.9 Limited recognition in patent cases.

(a) Any individual not registered under §10.6 may, upon a showing of circumstances which render it necessary or justifiable, be given limited recognition by the Director to prosecute as attorney or agent a specified application or specified applications, but limited recognition under this paragraph shall not extend further than the application or applications specified.

(b) When registration of a resident alien under paragraphs (a) or (b) of §10.6 is not appropriate, the resident alien may be given limited recognition as may be appropriate under paragraph (a) of this section.

§10.10 Individuals not registered or recognized to practice in patent cases.

Only practitioners who are registered under §10.6 or individuals given limited recognition under §10.9 will be permitted to prosecute patent applications of others before the Office.

§10.11 Removing names from the register.

(a) Registered attorneys and agents shall notify the Director of any change of address. Any notification to the Director of any change of address shall be separate from any notice of change of address filed in individual applications.

(b) A letter may be addressed to any individual on the register, at the address of which separate notice was last received by the Director, for the purpose of ascertaining whether such individual desires to remain on the register. The name of any individual failing to reply and give any information requested by the Director within a time limit specified will be removed from the register and the names of individuals so removed will be published in the *Official Gazette.* The name of any individual so removed may be reinstated on the register as may be appropriate and upon payment of the fee set forth in §1.21(a)(3) of this Subchapter.

(OMB Control No. 0651–0012)

§§10.12–10.13 [reserved]

§10.14 Individuals who may practice before the Office in trademark and other non-patent cases.

(a) *Attorneys.* Any individual who is an attorney may represent others before the Office in trademark and other non-patent cases. An attorney is not required to apply for registration or recognition to practice before the Office in trademark and other non-patent cases.

(b) *Non-lawyers.* Individuals who are not attorneys are not recognized to practice before the Office in trademark and other non-patent cases, except that individuals not arrotneys who were recognized to practice before the Office in trademark cases under this chapter prior to Jan. 1, 1957, will be recognized as agents to continue practice before the Office in trademark cases.

(c) *Foreigners.* Any foreign attorney or agent not a resident of the United States who shall prove to the satisfaction of the Director that he or she is registered or in good standing before the patent or trademark office of the country in which he or she resides and practices, may be recognized for the limited purpose of representing parties located in such country before the Office in the presentation and prosecution of trademark cases, *provided:* the patent or trademark office of such country allows substantially reciprocal privileges to those permitted to practice in trademark cases before the United States Patent and Trademark Office. Recognition under this paragraph shall continue only during the period that the conditions specified in this paragraph obtain.

(d) Recognition of any individual under this section shall not be construed as sanctioning or authorizing the performance of any act regarded in the jurisdiction where performed as the unauthorized practice of law.

(e) No individual other than those specified in paragraphs (a), (b), and (c) of this section will be permitted to practice before the Office in trademark cases. Any individual may appear in a trademark or other non-patent case in his or her own behalf. Any individual may appear in a trademark case for (1) a firm of which he or she is a member or (2) a corporation or association of which he or she is an officer and which he or she is authorized to represent, if such firm, corporation, or association is a party to a trademark proceeding pending before the Office.

§10.15 Refusal to recognize a practitioner.

Any practitioner authorized to appear before the Office may be suspended or excluded in accordance with the provisions of this part. Any practitioner who is suspended or excluded under this subpart or removed under §10.11(b) shall not be entitled to practice before the Office.

§§10.16–10.17 [reserved]

§10.18 Signature and certificate of practitioner.

(a) Every paper filed by a practitioner representing an applicant or party to a proceeding in the Office must bear the signature of, and be personally signed by, such practitioner except those papers which are required to be signed by the applicant or party. The signature of practitioner to a paper filed by him or her, constitutes a certificate that:

(1) the paper has been read by the practitioner;

(2) the paper's filing is authorized;

(3) to the best of his or her knowledge, information, and belief, there is good ground to support the paper, including any allegations of improper conduct contained or alleged therein; and

(4) it is not interposed for delay.

(b) Any practitioner knowingly violating the provisions of this section is subject to disciplinary action. See §10.23(c)(15).

§10.19 [reserved]

Patent and Trademark Office Code of Professional Responsibility

§10.20 Canons and Disciplinary Rules.

(a) Canons are set out in §§10.21, 10.30, 10.46, 10.56. 10.61, 10.76, 10.83, 10.100, and 10.110. Canons are statements of axiomatic norms, expressing in general terms the standards of professional conduct expected of practitioners in their relationships with the public, with the legal system, and with the legal profession.

(b) Disciplinary Rules are set out in §§10.22–10.24, 10.31–10.40, 10.47–10.57, 10.62–10.68, 10.77, 10.78, 10.84, 10.85, 10.87–10.89, 10.92, 10.93, 10.101–103, 10.111, and 10.112. Disciplinary Rules are mandatory in character and state the minimum level of conduct below which no practitioner can fall without being subjected to disciplinary action.

§10.21 Canon 1.

A practitioner should assist in maintaining the integrity and competence of the legal profession.

§10.22 Maintaining integrity and competence of the legal profession.

(a) A practitioner is subject to discipline if the practitioner has made a materially false statement in, or if the practitioner has deliberately failed to disclose a material fact requested in connection with, the practitioner's application for registration or membership in the bar of any United States court or any State court or his or her authority to otherwise practice before the Office in trademark and other non-patent cases.

(b) A practitioner shall not further the application for registration or membership in the bar of any United States court, State court, or administrative agency of another person known by the practitioner to be unqualified in respect to character, education, or other relevant attribute.

§10.23 Misconduct.

(a) A practitioner shall not engage in disreputable or gross misconduct.

(b) A practitioner shall not:

(1) Violate a Disciplinary Rule.

(2) Circumvent a Disciplinary Rule through actions of another.

(3) Engage in illegal conduct involving moral turpitude.

(4) Engage in conduct involving dishonesty, fraud, deceit, or misrepresentation.

(5) Engage in conduct that is prejudicial to the administration of justice.

(6) Engage in any other conduct that adversely reflects on the practitioner's fitness to practice before the Office.

(c) Conduct which constitutes a violation of paragraphs (a) and (b) of this section includes, but is not limited to:

(1) Conviction of a criminal offense involving moral turpitude, dishonesty, or breach of trust.

(2) Knowingly giving false or misleading information or knowingly participating in a material way in giving false or misleading information, to:

(i) A client in connection with any immediate, prospective, or pending business before the Office.

(ii) The Office or any employee of the Office.

(3) Misappropriation of, or failure to properly or timely remit, funds received by a practitioner or the practitioner's firm from a client to pay a fee which the client is required by law to pay to the Office.

(4) Directly or indirectly improperly influencing, attempting to improperly influence, offering or agreeing to improperly influence, or attempting to offer or agree to improperly influence an official action of any employee of the Office by:

(i) use of threats, false accusations, duress, or coercion,

(ii) an offer of any special inducement or promise of advantage, or

(iii) improperly bestowing of any gift, favor, or thing of value.

(5) Suspension or disbarment from practice as an attorney or agent on ethical grounds by any duly constituted authority of a State or the United States or, in the case of a practitioner who resides in a foreign country or is registered under §10.6(c), by any duly constituted authority of:

(i) a State,

(ii) the United States, or

(iii) the country in which the practitioner resides.

(6) Knowingly aiding or abetting a practitioner suspended or excluded from practice before the Office in engaging in unauthorized practice before the Office under §10.158.

(7) Knowingly withholding from the Office information identifying a patent or patent application of another from which one or more claims have been copied. See §§1.604(b) and 1.607(c) of this Subchapter.

(8) Failing to inform a client or former client or failing to timely notify the Office of an inability to notify to a client or former client of correspondence received from the Office or the client's or former client's opponent in an *inter partes* proceeding before the Office when the correspondence (i) could have a significant effect on a matter pending before the Office, (ii) is received by the practitioner on behalf of a client or former client and (iii) is correspondence of which a reasonable practitioner would believe under the circumstances the client or former client should be notified.

(9) Knowingly misusing a certificate of mailing under §1.8 of this Subchapter or a certificate of "Express Mail" under §1.10 of this Subchapter.

(10) Violating the duty of candor or good faith requirements of §1.56(a) of this Subchapter.

(11) Knowingly filing, or causing to be filed, an application which is subject to being stricken under §1.56(c) of this Subchapter.

(12) Knowingly filing, or causing to be filed, a frivolous complaint alleging a violation by a practitioner of the Patent and Trademark Office Code of Professional Responsibility.

(13) Knowingly preparing or prosecuting a patent application in violation of an undertaking signed under §10.6(e).

(14) Knowingly failing to advise the Director in writing of any change which would preclude continued registration under §10.6.

(15) Knowingly signing a paper filed in the Office in violation of the provisions of §10.18 or making a scandalous or indecent statement in a paper filed in the Office.

(16) Willfully refusing to reveal or report knowledge or evidence to the Director contrary to §10.24 or paragraph (b) of §10.131.

(17) Representing before the Office in a patent case either a joint venture comprising an inventor and an invention developer or an inventor referred to the registered practitioner by an invention developer when (i) the registered practitioner knows, or has been advised by the Office, that a formal complaint filed by a federal or state agency, based on any violation of any law relating to securities, unfair methods of competition, unfair or deceptive acts or practices, mail fraud, or other civil or criminal conduct, is pending before a federal or state court or federal or state agency, or has been resolved unfavorably by such court or agency, against the invention developer in connection with invention development services and (ii) the registered practitioner fails to fully advise the inventor of the existence of the pending complaint or unfavorable resolution thereof prior to undertaking or continuing representation of the joint venture or inventor. "Invention developer" means any person, and any agent, employee, officer, partner, or independent contractor thereof, who is not a registered practitioner and who advertises invention development services in media of general circulation or who enters into contracts for invention development services with customers as a result of such advertisement. "Invention development services" means acts of invention development required or promised to be performed, or actually performed, or both, by an invention developer for a customer. "Invention development" means the evaluation, perfection, marketing, brokering, or promotion of an invention on behalf of a customer by an invention developer, including a patent search, preparation of a patent application, or any other act done by an invention developer for consideration toward the end of procuring or attempting to procure a license, buyer, or patent for an invention. "Customer" means any individual who has made an invention and who enters into a contract for invention development services with an invention developer with respect to the invention by which the inventor becomes obligated to pay the invention developer less than $5,000 (not to include any additional sums which the invention developer is to receive as a result of successful development of the invention). "Contract for invention development services" means a contract for invention development services with an invention developer with respect to an invention made by a customer by which the inventor becomes obligated to pay the invention developer less than $5,000 (not to include any additional sums which the invention developer is to receive as a result of successful development of the invention).

(18) In the absence of information sufficient to establish a reasonable belief that fraud or inequitable conduct has occurred, alleging before a tribunal that anyone has committed a fraud on the Office or engaged in inequitable conduct in a proceeding before the Office.

(d) A practitioner who acts with reckless indifference to whether a representation is true or false is chargeable with knowledge of its falsity. Deceitful statements of half-truths or concealment of material facts shall be deemed actual fraud within the meaning of this part.

§10.24 Disclosure of information to authorities

(a) A practitioner possessing unprivileged knowledge of a violation of a Disciplinary Rule shall report such knowledge to the Director.

(b) A practitioner possessing unprivileged knowledge or evidence concerning another practitioner, employee of the Office, or a judge shall reveal fully such knowledge or evidence upon proper request of a tribunal or other authority empowered to investigate or act upon the conduct of practitioners, employees of the Office, or judges.

(OMB Control No. 0651-0017)

§§10.25–10.29 [reserved]

§10.30 Canon 2.

A practitioner should assist the legal profesion in fulfilling its duty to make legal counsel available.

§10.31 Communications concerning a practitioner's services.

(a) No practitioner shall with respect to any prospective business before the Office, by word, circular, letter, or advertising, with intent to defraud in any manner, deceive, mislead, or threaten any prospective applicant or other person having immediate or prospective business before the Office.

(b) A practitioner may not use the name of a Member of either House of Congress or of an individual in the service of the United States in advertising the practitioner's practice before the Office.

(c) Unless authorized under §10.14(b), a non-lawyer practitioner shall not hold himself or herself out as authorized to practice before the Office in trademark cases.

(d) Unless a practitioner is an attorney, the practitioner shall not hold himself or herself out:

(1) to be an attorney or lawyer or

(2) as authorized to practice before the Office in non-patent and trademark cases.

§10.32 Advertising.

(a) Subject to §10.31, a practitioner may advertise services through public media, including a telephone directory, legal directory, newspaper, or other periodical, radio, or television, or through written communications not involving solicitation as defined by §10.33.

(b) A practitioner shall not give anything of value to a person for recommending the practitioner's services, except that a practitioner may pay the reasonable cost of advertising or written communication permitted by this section and may pay the usual charges of a not-for-profit lawyer referreal service or other legal service organization.

(c) Any communication made pursuant to this section shall include the name of at least one practitioner responsible for its content.

§10.33 Direct contact with prospective clients.

A practitioner may not solicit professional employment from a prospective client with whom the practitioner has no family or prior professional relationship, by mail, in-person or otherwise, when a significant motive for the practitioner's doing so is the practitioner's pecuniary gain under circumstances evidencing undue influence, intimidation, or overreaching. The term "solicit" includes contact in person, by telephone or telegraph, by letter or other writing, or by other communication directed to a specific recipient, but does not include letters addressed or advertising circulars distributed generally to persons not specifically known to need legal services of the kind provided by the practitioner in a particular matter, but who are so situated that they might in general find such services useful.

§10.34 Communication of fields of practice.

A registered practitioner may state or imply that the practitioner is a specialist as follows:

(a) A registered practitioner who is an attorney may use the designation "Patents," "Patent Attorney," "Patent Lawyer," "Registered Patent Attorney," or a substantially similar designation.

(b) A registered practitioner who is not an attorney may use the designation "Patents," "Patent Agent," "Registered Patent Agent," or a substantially similar designation, except that any practitioner who was registered prior to November 15, 1938, may refer to himself or herself as a "patent attorney."

§10.35 Firm names and letterheads.

(a) A practitioner shall not use a firm name, letterhead, or other professional designation that violates §10.31. A trade name may be used by a practitioner in private practice if it does not imply a current connection with a government agency or with a public or charitable legal services organzation and is not otherwise in violation of §10.31.

(b) Practitioners may state or imply that they practice in a partnership or other organization only when that is the fact.

§10.36 Fees for legal services.

(a) A practitioner shall not enter into an agreement for, charge, or collect an illegal or clearly excessive fee.

(b) A fee is clearly excessive when, after a review of the facts, a practitioner of ordinary prudence would be left with a definite and firm conviction that the fee is in excess of a reasonable fee. Factors to be considered as guides in determining the reasonableness of a fee include the following:

(1) The time and labor required, the novelty and difficulty of the questions involved, and the skill requisite to perform the legal service properly.

(2) The likelihood, if apparent to the client, that the acceptance of the particular employment will preclude other employment by the practitioner.

(3) The fee customarily charged for similar legal services.

(4) The amount involved and the results obtained.

(5) The time limitations imposed by the client or by the circumstances.

(6) The nature and length of the professional relationship with the client.

(7) The experience, reputation, and ability of the practitioner or practitioners performing the services.

(8) Whether the fee is fixed or contingent.

§10.37 Division of fees among practitioners.

(a) A practitioner shall not divide a fee for legal services with another practitioner who is not a partner in or associate of the practitioner's law firm or law office, unless:

(1) The client consents to employment of the other practitioner after a full disclosure that a division of fees will be made.

(2) The division is made in proportion to the services performed and responsibility assumed by each.

(3) The total fee of the practitioners does not clearly exceed reasonable compensation for all legal services rendered to the client.

(b) This section does not prohibit payment to a former partner or associate pursuant to a separation or retirement agreement.

§10.38 Agreements restricting the practice of a practitioner.

(a) A practitioner shall not be a party to or participate in a partnership or employment agreement with another practitioner that restricts the right of a practitioner to practice before the Office after the termination of a relationship created by the agreement, except as a condition to payment of retirement benefits.

(b) In connection with the settlement of a controversy or suit, a practitioner shall not enter into an agreement that restricts the practitioner's right to practice before the Office.

§10.39 Acceptance of employment.

A practitioner shall not accept employment on behalf of a person if the practitioner knows or it is obvious that such person wishes to:

(a) Bring a legal action, commence a proceeding before the Office, conduct a defense, assert a position in any proceeding pending before the Office, or otherwise have steps taken for the person, merely for the purpose of harassing or maliciously injuring any other person.

(b) Present a claim or defense in litigation or any proceeding before the Office that is not warranted under existing law, unless it can be supported by good faith argument for an extension, modification, or reversal of existing law.

§10.40 Withdrawal from employment.

(a) A practitioner shall not withdraw from employment in a proceeding before the Office without permission from the Office (see §§1.36, and 2.19 of this Subchapter). In any event, a practitioner shall not withdraw from employment until the practitioner has taken reasonable steps to avoid foreseeable prejudice to the rights of the client, including giving due notice to his or her client, allowing time for employment of another practitioner, delivering to the client all papers and property to which the client is entitled, and complying with applicable laws and rules. A practitioner who withdraws from employment shall refund promptly any part of a fee paid in advance that has not been earned.

(b) Mandatory withdrawal. A practitioner representing a client before the Office shall withdraw from employment if:

(1) the practitioner knows or it is obvious that the client is bringing a legal action, commencing a proceeding before the Office, conducting a defense, or asserting a position in litigation or any proceeding pending before the Office, or is otherwise having steps taken for the client, merely for the purpose of harassing or maliciously injuring any person;

(2) the practitioner knows or it is obvious that the practitioner's continued employment will result in violation of a Disciplinary Rule;

(3) the practitioner's mental or physical condition renders it unreasonably difficult for the practitioner to carry out the employment effectively; or

(4) the practitioner is discharged by the client.

(c) Permissive withdrawal. If paragraph (b) of this section is not applicable, a practitioner may not request permission to withdraw in matters pending before the Office unless such request or such withdrawal is because:

(1) the petitioner's client:

(i) insists upon presenting a claim or defense that is not warranted under existing law and cannot be supported by good faith argument for an extension, modification, or reversal of existing law;

(ii) personally seeks to pursue an illegal course of conduct;

(iii) insists that the practitioner pursue a course of conduct that is illegal or that is prohibited under a Disciplinary Rule;

(iv) by other conduct renders it unreasonably difficult for the practitioner to carry out the employment effectively;

(v) insists, in a matter not pending before a tribunal, that the practitioner engage in conduct that is con-

trary to the judgment and advice of the practitioner but not prohibited under the Disciplinary Rule; or

(vi) has failed to pay one or more bills rendered by the practitioner for an unreasonable period of time or has failed to honor an agreement to pay a retainer in advance of the performance of legal services.

(2) the practitioner's continued employment is likely to result in a violation of a Disciplinary Rule;

(3) the practitioner's inability to work with co-counsel indicates that the best interests of the client likely will be served by withdrawal;

(4) the practitioner's mental or physical condition renders it difficult for the practitioner to carry out the employment effectively;

(5) the practitioner's client knowingly and freely assents to termination of the employment; or

(6) the practitioner believes in good faith, in a proceeding pending before the Office, that the Office will find the existence of other good cause for withdrawal.

§§10.41-10.45 [reserved]

§10.46 Canon 3.

A practitioner should assist in preventing the unauthorized practice of law.

§10.47 Aiding unauthorized practice of law.

(a) A practitioner shall not aid a non-practitioner in the unauthorized practice of law before the Office.

(b) A practitioner shall not aid a suspended or excluded practitioner in the practice of law before the Office.

(c) A practitioner shall not aid a non-lawyer in the unauthorized practice of law.

§10.48 Sharing legal fees.

A practitioner or a firm of practitioners shall not share legal fees with a non-practitioner except that:

(a) An agreement by a practitioner with the practitioner's firm, partner, or associate may provide for the payment of money, over a reasonable period of time after the practitioner's death, to the practitioner's estate or to one or more specified persons.

(b) A practitioner who undertakes to complete unfinished legal business of a deceased practitioner may pay to the estate of the deceased practitioner that proportion of the total compensation which fairly represents the services rendered by the deceased practitioner.

(c) A practitioner or firm of practitioners may include non-practitioner employees in a compensation or retirement plan, even though the plan is based in whole or in part on a profit-sharing arrangement, providing such plan does not circumvent another Disciplinary Rule.

§10.49 Forming a partnership with a non-practitioner.

A practitioner shall not form a partnership with a non-practitioner if any of the activities of the partnership consist of the practice of patent, trademark, or other law before the Office.

§§10.50-10.55 [reserved]

§10.56 Canon 4.

A practitioner should preserve the confidences and secrets of a client.

§10.57 Preservation of confidences and secrets of a client.

(a) "Confidence" refers to information protected by the attorney-client or agent-client privilege under applicable law. "Secret" refers to other information gained in the professional relationship that the client has requested be held inviolate or the disclosure of which would be embarrassing or would be likely to be detrimental to the client.

(b) Except when permitted under paragraph (c) of this section, a practitioner shall not knowingly:

(1) Reveal a confidence or secret of a client.

(2) Use a confidence or secret of a client to the disadvantage of the client.

(3) Use a confidence or secret of a client for the advantage of the practitioner or of a third person, unless the client consents after full disclosure.

(c) A practitioner may reveal:

(1) Confidences or secrets with the consent of the client affected but only after a full disclosure to the client.

(2) Confidences or secrets when permitted under Disciplinary Rules or required by law or court order.

(3) The intention of a client to commit a crime and the information necessary to prevent the crime.

(4) Confidences or secrets necessary to establish or collect the practitioner's fee or to defend the practitioner or the practitioner's employees or associates against an accusation of wrongful conduct.

(d) A practitioner shall exercise reasonable care to prevent the practitioner's employees, associates, and others whose services are utilized by the practitioner from disclosing or using confidences or secrets of a client, except that a practitioner may reveal the information allowed by parargraph (c) of this section through an employee.

§§10.58-10.60 [reserved]

§10.61 Canon 5.

A practitioner should exercise independent professional judgment on behalf of a client.

§10.62 Refusing employment when the interest of the practitioner may impair the practitioner's independent professional judgment.

(a) Except with the consent of a client after full disclosure, a practitioner shall not accept employment if the exercise of the practitioner's professional judgment on behalf of the client will be or reasonably may be affected by the practitioner's own financial, business, property, or personal interests.

(b) A practitioner shall not accept employment in a proceeding before the Office if the practitioner knows or it is obvious that the practitioner or another practitioner in the practitioner's firm ought to sign an affidavit to be filed in the Office or be called as a witness, except that the practitioner may undertake the employment and the practitioner or another practitioner in the practitioner's firm may testify:

(1) If the testimony will relate solely to an uncontested matter.

(2) If the testimony will relate solely to a matter of formality and there is no reason to believe that substantial evidence will be offered in opposition to the testimony.

(3) If the testimony will relate solely to the nature and value of legal services rendered in the case by the practitioner or the practitioner's firm to the client.

(4) As to any matter, if refusal would work a substantial hardship on the client because of the distinctive value of the practitioner or the practitioner's firm as counsel in the particular case.

§10.63 Withdrawal when the practitioner becomes a witness.

(a) If, after undertaking employment in a proceeding in the Office, a practitioner learns or it is obvious that the practitioner or another practitioner in the practitioner's firm ought to sign an affidavit to be filed in the Office or be called as a witness on behalf of a practitioner's client, the practitioner shall withdraw from the conduct of the proceeding and the practitioner's firm, if any, shall not continue representation in the proceeding, except that the practitioner may continue the representation and the practitioner or another practitioner in the practitioner's firm may testify in the circumstances enumerated in paragraphs (1) through (4) of §10.62(b).

(b) If, after undertaking employment in a proceeding before the Office, a practitioner learns or it is obvious that the practitioner or another practitioner in the practitioner's firm may be asked to sign an affidavit to be filed in the Office or be called as a witness other than on behalf of the practitioner's client, the practitioner may continue the representation until it is apparent that the practitioner's affidavit or testimony is or may be prejudicial to the practitioner's client.

§10.64 Avoiding acquisition of interest in litigation or proceeding before the Office.

(a) A practitioner shall not acquire a proprietary interest in the subject matter of a proceeding before the Office which the practitioner is conducting for a client, except that the practitioner may:

(1) Acquire a lien granted by law to secure the

practitioner's fee or expenses; or

(2) Contract with a client for a reasonable contingent fee; or

(3) In a patent case, take an interest in the patent as part or all of his or her fee.

(b) While representing a client in connection with a contemplated or pending proceeding before the Office, a practitioner shall not advance or guarantee financial assistance to a client, except that a practitioner may advance or guarantee the expenses of going forward in a proceeding before the Office including fees required by law to be paid to the Office, expenses of investigation, expenses of medical examination, and costs of obtaining and presenting evidence, provided the client remains ultimately liable for such expenses. A practitioner may, however, advance any fee required to prevent or remedy an abandonment of a client's application by reason of an act or omission attributable to the practitioner and not to the client, whether or not the client is ultimately liable for such fee.

§10.65 Limiting business relations with a client.

A practitioner shall not enter into a business transaction with a client if they have differing interests therein and if the client expects the practitioner to exercise professional judgment therein for the protection of the client, unless the client has consented after full disclosure.

§10.66 Refusing to accept or continue employment if the interests of another client may impair the independent professional judgment of the practitioner.

(a) A practitioner shall decline proffered employment if the exercise of the practitioner's independent professional judgment in behalf of a client will be or is likely to be adversely affected by the acceptance of the proffered employment, or if it would be likely to involve the practitioner in representing differing interests, except to the extent permitted under paragraph (c) of this section.

(b) A practitioner shall not continue multiple employment if the exercise of the practitioner's independent professional judgment in behalf of a client will be or is likely to be adversely affected by the practitioner's representation of another client, or if it would be likely to involve the practitioner in representing differing interests, except to the extent permitted under paragraph (c) of this section.

(c) In the situations covered by paragraphs (a) and (b) of this section a practitioner may represent multiple clients if it is obvious that the practitioner can adequately represent the interest of each and if each consents to the representation after full disclosure of the possible effect of such representation on the exercise of the practitioner's independent professional judgment on behalf of each.

(d) If a practitioner is required to decline employment or to withdraw from employment under a Disciplinary Rule, no partner, or associate, or any other practitioner affiliated with the practitioner or the practitioner's firm, may accept or continue such employment unless otherwise ordered by the Director or Commissioner.

§10.67 Settling similar claims of clients.

A practitioner who represents two or more clients shall not make or participate in the making of an aggregate settlement of the claims of or against the practitioner's clients, unless each client has consented to the settlement after being advised of the existence and nature of all the claims involved in the proposed settlement, of the total amount of the settlement, and of the participation of each person in the settlement.

§10.68 Avoiding influence by others than the client.

(a) Except with the consent of the practitioner's client after full disclosure, a practitioner shall not:

(1) Accept compensation from one other than the practitioner's client for the practitioner's legal services to or for the client.

(2) Accept from one other than the practitioner's client any thing of value related to the practitioner's representation of or the practitioner's employment by the client.

(b) A practitioner shall not permit a person who recommends, employs, or pays the practitioner to render legal services for another, to direct or regulate the practitioner's professional judgment in rendering such legal services.

(c) A practitioner shall not practice with or in the form of a professional corporation or association authorized to practice law for a profit, if a non-practioner has the right to direct or control the professional judgment of a practitioner.

§§10.69-10.75 [reserved]

§10.76 Canon 6.

A practitioner should represent a client competently.

§10.77 Failing to act competently.

A practitioner shall not:

(a) Handle a legal matter which the practitioner knows or should know that the practitioner is not competent to handle, without associating with the practitioner another practitioner who is competent to handle it.

(b) Handle a legal matter without preparation adequate in the circumstances.

(c) Neglect a legal matter entrusted to the practitioner.

§10.78 Limiting liability to client.

A practitioner shall not attempt to exonerate himself or herself from, or limit his or her liability to, a client for his or her personal malpractice.

§§10.79-10.82 [reserved]

§10.83 Canon 7.

A practitioner should represent a client zealously within the bounds of the law.

§10.84 Representing a client zealously.

(a) A practitioner shall not intentionally:

(1) Fail to seek the lawful objectives of a client through reasonably available means permitted by law and the Disciplinary Rules, except as provided by paragraph (b) of this section. A practitioner does not violate the provisions of this section, however, by acceding to reasonable requests of opposing counsel which do not prejudice the rights of the client, by being punctual in fulfilling all professional commitments, by avoiding offensive tactics, or by treating with courtesy and consideration all persons involved in the legal process.

(2) Fail to carry out a contract of employment entered into with a client for professional services, but a practitioner may withdraw as permitted under §§10.40, 10.63, and 10.66.

(3) Prejudice or damage a client during the course of a professional relationship, except as required under this part.

(b) In representation of a client, a practitioner may:

(1) Where permissible, exercise professional judgment to waive or fail to assert a right or position of the client.

(2) Refuse to aid or participate in conduct that the practitioner believes to be unlawful, even though there is some support for an argument that the conduct is legal.

§10.85 Representing a client within the bounds of the law.

(a) In representation of a client, a practitioner shall not:

(1) Initiate or defend any proceeding before the Office, assert a position, conduct a defense, delay a trial or proceeding before the Office, or take other action on behalf of the practitioner's client when the practitioner knows or when it is obvious that such action would serve merely to harass or maliciously injure another.

(2) Knowingly advance a claim or defense that is unwarranted under existing law, except that a practitioner may advance such claim or defense if it can be supported by good faith argument for an extension, modification, or reversal of existing law.

(3) Conceal or knowingly fail to disclose that which the practitioner is required by law to reveal.

(4) Knowingly use perjured testimony or false evidence.

(5) Knowingly make a false statement of law or fact.

(6) Participate in the creation or preservation of evidence when the practitioner knows or it is obvious that the evidence is false.

(7) Counsel or assist a client in conduct that the practitioner knows to be illegal or fraudulent.

(8) Knowingly engage in other illegal conduct or conduct contrary to a Disciplinary Rule.

(b) A practitioner who receives information clearly establishing that:

(1) A client has, in the course of the representation, perpetrated a fraud upon a person or tribunal shall promptly call upon the client to rectify the same, and if the client refuses or is unable to do so the practitioner shall reveal the fraud to the affected person or tribunal.

(2) A person other than a client has perpetrated a fraud upon a tribunal shall promptly reveal the fraud to the tribunal.

§10.86 [reserved]

§10.87 Communicating with one of adverse interest.

During the course of representation of a client, a practitioner shall not:

(a) Communicate or cause another to communicate on the subject of the representation with a party the practitioner knows to be represented by another practitioner in that matter unless the practitioner has the prior consent of the other practitioner representing such other party or is authorized by law to do so. It is not improper, however, for a practitioner to encourage a client to meet with an opposing party for settlement discussions.

(b) Give advice to a person who is not represented by a practitioner other than the advice to secure counsel, if the interests of such person are or have a reasonable possibility of being in conflict with the interests of the practitioner's client.

§10.88 Threatening criminal prosecution.

A practitioner shall not present, participate in presenting, or threaten to present criminal charges solely to obtain an advantage in any prospective or pending proceeding before the Office.

§10.89 Conduct in proceedings.

(a) A practitioner shall not disregard or advise a client to disregard any provision of this Subchapter or a decision of the Office made in the course of a proceeding before the Office, but the practitioner may take appropriate steps in good faith to test the validity of such provision or decision.

(b) In presenting a matter to the Office, a practitioner shall disclose:

(1) Controlling legal authority known to the practitioner to be directly adverse to the position of the client and which is not disclosed by opposing counsel or an employee of the Office.

(2) Unless privileged or irrelevant, the identities of the client the practitioner represents and of the persons who employed the practitioner.

(c) In appearing in a professional capacity before a tribunal, a practitioner shall not:

(1) State or allude to any matter that the practitioner has no reasonable basis to believe is relevant to the case or that will not be supported by admissible evidence.

(2) Ask any question that the practitioner has no reasonable basis to believe is relevant to the case and that is intended to degrade a witness or other person.

(3) Assert the practitioner's personal knowledge of the facts in issue, except when testifying as a witness.

(4) Assert the practitioner's personal opinion as to the justness of a cause, as to the credibility of a witness, as to the culpability of a civil litigant, or as to the guilt or innocence of an accused; but the practitioner may argue, on the practitioner's analysis of the evidence, for any position or conclusion with respect to the matters stated herein.

(5) Engage in undignified or discourteous conduct before the Office (see §1.3 of the Subchapter).

(6) Intentionally or habitually violate any provision of this Subchapter or established rule of evidence.

§10.90–10.91 [reserved]

§10.92 Contact with witnesses.

(a) A practitioner shall not suppress any evidence that the practitioner or the practitioner's client has a legal obligation to reveal or produce.

(b) A practitioner shall not advise or cause a person to be secreted or to leave the jurisdiction of a tribunal for the purpose of making the person unavailable as a witness therein.

(c) A practitioner shall not pay, offer to pay, or acquiesce in the payment of compensation to a witness contingent upon the content of the witness' affidavit, testimony or the outcome of the case. But a practitioner may advance, guarantee, or acquiesce in the payment of:

(1) Expenses reasonably incurred by a witness in attending, testifying, or making an affidavit.

(2) Reasonable compensation to a witness for the witness' loss of time in attending, testifying, or making an affidavit.

(3) A reasonable fee for the professional services of an expert witness.

§10.93 Contact with officials.

(a) A practitioner shall not give or lend anything of value to a judge, official, or employee of a tribunal under circumstances which might give the appearance that the gift or loan is made to influence official action.

(b) In an adversary proceeding, including any *inter partes* proceeding before the Office, a practitioner shall not communicate, or cause another to communicate, as to the merits of the cause with a judge, official, or Office employee before whom the proceeding is pending, except:

(1) In the course of official proceedings in the cause.

(2) In writing if the practitioner promptly delivers a copy of the writing to opposing counsel or to the adverse party if the adverse party is not represented by a practitioner.

(3) Orally upon adequate notice to opposing counsel or to the adverse party if the adverse party is not represented by a practitioner.

(4) As otherwise authorized by law.

§§10.94-10.99 [reserved]

§10.100 Canon 8.

A practitioner should assist in improving the legal system.

§10.101 Action as a public official.

(a) A practitioner who holds public office shall not:

(1) Use the practitioner's public position to obtain, or attempt to obtain, a special advantage in legislative matters for the practitioner or for a client under circumstances where the practitioner knows or it is obvious that such action is not in the public interest.

(2) Use the practitioner's public position to influence, or attempt to influence, a tribunal to act in favor of the practitioner or of a client.

(3) Accept any thing of value from any person when the practitioner knows or it is obvious that the offer is for the purpose of influencing the practitioner's action as a public official.

(b) A practitioner who is an officer or employee of the United States shall not practice before the Office in patent cases except as provided in §10.6(d).

§10.102 Statements concerning officials.

(a) A practitioner shall not knowingly make false statements of fact concerning the qualifications of a candidate for election or appointment to a judicial office or to a position in the Office.

(b) A practitioner shall not knowingly make false accusations against a judge, other adjudicatory officer, or employee of the Office.

§10.103 Practitioner candidate for judicial office.

A practitioner who is a candidate for judicial office shall comply with applicable provisions of law.

§10.104-10.109 [reserved]

§10.110 Canon 9.

A practitioner should avoid even the appearance of professional impropriety.

§10.111 Avoiding even the appearance of impropriety.

(a) A practitioner shall not accept private employment in a matter upon the merits of which he or she has acted in a judicial capacity.

(b) A practitioner shall not accept private employment in a matter in which he or she had personal responsibili-

ty while a public employee.

(c) A practitioner shall not state or imply that the practitioner is able to influence improperly or upon irrelevant grounds any tribunal, legislative body, or public official.

§10.112 Preserving identity of funds and property of client.

(a) All funds of clients paid to a practitioner or a practitioner's firm, other than advances for costs and expenses, shall be deposited in one or more identifiable bank accounts maintained in the United States or, in the case of a practitioner having an office in a foreign country or registered under §10.6(c), in the United States or the foreign country.

(b) No funds belonging to the practitioner or the practitioner's firm shall be deposited in the bank accounts required by paragraph (a) of this section except as follows:

(1) Funds reasonably sufficient to pay bank charges may be deposited therein.

(2) Funds belonging in part to a client and in part presently or potentially to the practitioner or the practitioner's firm must be deposited therein, but the portion belonging to the practitioner or the practitioner's firm may be withdrawn when due unless the right of the practitioner or the practitioner's firm to receive it is disputed by the client, in which event the disputed portion shall not be withdrawn until the dispute is finally resolved.

(c) A practitioner shall:

(1) Promptly notify a client of the receipt of the client's funds, securities, or other properties.

(2) Identify and label securities and properties of a client promptly upon receipt and place them in a safe deposit box or other place of safekeeping as soon as practicable.

(3) Maintain complete records of all funds, securities, and other properties of a client coming into the possession of the practitioner and render appropriate accounts to the client regarding the funds, securities, or other properties.

(4) Promptly pay or deliver to the client as requested by a client the funds, securities, or other properties in the possession of the practitioner which the client is entitled to receive.

(OMB Control No. 0651-0017)

§§10.113-10.129 [reserved]

Investigations and Disciplinary Proceedings

§10.130 Reprimand, suspension or exclusion.

(a) The Commissioner may, after notice and opportunity for a hearing, (a) reprimand or (b) suspend or exclude, either generally or in any particular case, any individual, attorney, or agent shown to be incompetent or disreputable, who is guilty of gross misconduct, or who violates a Disciplinary Rule.

(b) Petitions to disqualify a practitioner in *ex parte* or *inter partes* cases in the Office are not governed by §§10.130 through 10.170 and will be handled on a case-by-case basis under such conditions as the Commissioner deems appropriate.

§10.131 Investigations.

(a) The Director is authorized to investigate possible violations of Disciplinary Rules by practitioners. See §10.2(b) (2).

(b) Practitioners shall report and reveal to the Director any knowledge or evidence required by §10.24. A practitioner shall cooperate with the Director in connection with any investigation under paragraph (a) of this section and with officials of the Office in connection with any disciplinary proceeding instituted under §10.132(b).

(c) Any non-practitioner possessing knowledge or information concerning a violation of a Disciplinary Rule by a practitioner may report the violation to the Director. The Director may require that the report be presented in the form of an affidavit.

§10.132 Initiating a disciplinary proceeding; reference to an administrative law judge.

(a) If after conducting an investigation under §10.131(a) the Director is of the opinion that a practitioner has violated a Disciplinary Rule, the Director shall after complying where necessary with the provisions of 5 U.S.C. 558(c), call a meeting of the Committee on Discipline. The Committee on Discipline shall then determine as specified in §10.4(b) whether a disciplinary proceeding shall be instituted under paragraph (b) of this section.

(b) If the Committee on Discipline determines that probable cause exists to believe that a practitioner has violated a Disciplinary Rule, the Director shall institute a disciplinary proceeding by filing a complaint under §10.134. The complaint shall be filed in the Office of the Director. A disciplinary proceeding may result in:

(1) a reprimand or

(2) suspension or exclusion of a practitioner from practice before the Office.

(c) Upon the filing of a complaint under §10.134, the Commissioner will refer the disciplinary proceeding to an administrative law judge.

§10.133 Conference between Director and practitioner; resignation.

(a) *General.* The Director may confer with a practitioner concerning possible violations by the practitioner of a Disciplinary Rule whether or not a disciplinary proceeding has been instituted.

(b) *Resignation.* Any practitioner who is the subject of an investigation under §10.131 or against whom a complaint has been filed under §10.134 may resign from practice before the Office only by submitting with the Director an affidavit stating his or her desire to resign.

(c) If filed prior to the date set by the administrative law judge for a hearing, the affidavit shall state that:

(1) the resignation is freely and voluntarily proferred;

(2) the practitioner is not acting under duress or coersion from the Office;

(3) the practitioner is fully aware of the implications of filing the resignation;

(4) the practitioner is aware (i) of a pending investigation or (ii) of charges arising from the complaint alleging that he or she is guilty of a violation of the Patent and Trademark Office Code of Professional Responsibility, the nature of which shall be set forth by the practitioner to the satisfaction of the Director;

(5) the practitioner acknowledges that, if and when he or she applies for reinstatement under §10.160, the Director will conclusively presume, for the limited purpose of determining the application for reinstatement, that:

(i) the facts upon which the complaint is based are true and

(ii) the practitioner could not have successfully defended himself or herself against (A) charges predicated on the violation under investigation or (B) charges set out in the complaint filed against the practitioner.

(d) If filed on or after the date set by the administrative law judge for a hearing, the affidavit shall make the statements required by subparagraphs (1) through (4) of paragraph (b) of this section and shall state that:

(1) the practitioner acknowledges the facts upon which the complaint is based are ture; and

(2) the resignation is being submitted because the practitioner could not successfully defend himself or herself against (i) charges predicated on the violation under investigation or (ii) charges set out in the complaint.

(e) When an affidavit under paragraph (b) or (c) of this section is received while an investigation is pending, the Commissioner shall enter an order excluding the practitioner "on consent." When an affidavit under paragraphs (b) or (c) of this section is received after a complaint under §10.134 has been filed, the Director shall notify the administrative law judge. The administrative law judge shall enter an order transferring the disciplinary proceeding to the Commissioner and the Commissioner shall enter an order excluding the practitioner "on consent."

(f) Any practitioner who resigns from practice before the Office under this section and who intends to reapply

for admission to practice before the Office must comply with the provisions of §10.158.

(g) Settlement. Before or after a complaint is filed under §10.134, a settlement conference may occur between the Director and a practitioner for the purpose of settling any disciplinary matter. If an offer of settlement is made by the Director or the practitioner and is not accepted by the other, no reference to the offer of settlement or its refusal shall be admissible in evidence in the disciplinary proceeding unless both the Director and the practitioner agree in writing.

§10.134 Complaint.

(a) A complaint instituting a disciplinary proceeding shall:

(1) Name the practitioner, who may then be referred to as the "respondent."

(2) Give a plain and concise description of the alleged violations of the Disciplinary Rules by the practitioner.

(3) State the place and time for filing an answer by the respondent.

(4) State that a decision by default may be entered against the respondent if an answer is not timely filed.

(5) Be signed by the Director.

(b) A complaint will be deemed sufficient if it fairly informs the respondent of any violation of the Disciplinary Rules which form the basis for the disciplinary proceeding so that the respondent is able to adequately prepare a defense.

§10.135 Service of complaint.

(a) A complaint may be served on a respondent in any of the following methods:

(1) By handing a copy of the complaint personally to the respondent, in which case the individual handing the complaint to the respondent shall file an affidavit with the Director indicating the time and place the complaint was handed to the respondent.

(2) By mailing a copy of the complaint by "Express Mail" or first-class mail to:

(i) a registered practitioner at the address for which separate notice was last received by the Director or

(ii) a non-registered practitioner at the last address for the respondent known to the Director.

(3) By any method mutually agreeable to the Director and the respondent.

(b) If a complaint served by mail under paragraph (a)(2) of this section is returned by the U.S. Postal Service, the Director shall mail a second copy of the complaint to the respondent. If the second copy of the complaint is also returned by the U.S. Postal Service, the Director shall serve the respondent by publishing an appropriate notice in the *Official Gazette* for four consecutive weeks, in which case the time for answer shall be at least thirty days from the fourth publication of the notice.

(c) If a respondent is a registered practitioner, the Director may serve simultaneously with the complaint a letter under §10.11(b). The Director may require the respondent to answer the §10.11(b) letter within a period of not less than 15 days. An answer to the §10.11(b) letter shall constitute proof of service. If the respondent fails to answer the §10.11(b) letter, his or her name will be removed from the register as provided by §10.11(b).

(d) If the respondent is represented by an attorney under §10.140(a), a copy of the complaint shall also be served on the attorney.

§10.136 Answer to complaint.

(a) *Time for answer.* An answer to a complaint shall be filed within a time set in the complaint which shall be not less than thirty days.

(b) *With whom filed.* The answer shall be filed in writing with the administrative law judge. The time for filing an answer may be extended once for a period of no more than thirty days by the administrative law judge upon a showing of good cause provided a motion requesting an extension of time is filed within thirty days after the date the complaint is filed by the Director. A copy of the answer shall be served on the Director.

(c) *Content.* The respondent shall include in the answer a statement of the facts which constitute the grounds of defense and shall specifically admit or deny each allegation set forth in the complaint. The respondent shall not deny a material allegation in the complaint which the respondent knows to be true or state that respondent is without sufficient information to form a belief as to the truth of an allegation when in fact the respondent possesses that information. The respondent shall also state affirmatively special matters of defense.

(d) *Failure to deny allegations in complaint.* Every allegation in the complaint which is not denied by a respondent in the answer is deemed to be admitted and may be considered proven. No further evidence in respect of that allegation need be received by the administrative law judge at any hearing. Failure to timely file an answer will constitute an admission of the allegations in the complaint.

(e) *Reply by Director.* No reply to an answer is required by the Director and any affirmative defense in the answer shall be deemed to be denied. The Director may, however, file a reply if he or she chooses or if ordered by the adminstrative law judge.

§10.137 Supplemental complaint.

False statements in an answer may be made the basis of a supplemental complaint.

§10.138 Contested case.

Upon the filing of an answer by the respondent, a disciplinary proceeding shall be regarded as a contested case within the meaning of 35 U.S.C. 24. Evidence obtained by a subpoena issued under 35 U.S.C. 24 shall not be admitted into the record or considered unless leave to proceed under 35 U.S.C. 24 was previously authorized by the administrative law judge.

§10.139 Administrative law judge; appointment; responsibilities; review of interlocutory orders; stays.

(a) *Appointment.* An administrative law judge, appointed under 5 U.S.C. 3105, shall conduct disciplinary proceedings as provided by this part.

(b) *Responsibilities.* The administrative law judge shall have authority to:

(1) Administer oaths and affirmations;

(2) Make rulings upon motions and other requests;

(3) Rule upon offers of proof, receive relevant evidence, and examine witnesses;

(4) Authorize the taking of a deposition of a witness in lieu of personal appearance of the witness before the adminstrative law judge;

(5) Determine the time and place of any hearing and regulate its course and conduct;

(6) Hold or provide for the holding of conferences to settle or simplify the issues;

(7) Receive and consider oral or written arguments on facts or law;

(8) Adopt procedures and modify procedures from time to time as occasion requires for the orderly disposition of proceedings;

(9) Make initial decisions under §10.154; and

(10) Perform acts and take measures as necessary to promote the efficient and timely conduct of any disciplinary proceeding.

(c) *Time for making initial decision.* The administrative law judge shall set times and exercise control over a disciplinary proceeding such that an initial decision under §10.154 is normally issued within six months of the date a complaint is filed. The administrative law judge may, however, issue an initial decision more than six months after a complaint is filed if in his or her opinion there exist unusual circumstances which preclude issuance of an initial decision within six months of the filing of the complaint.

(d) *Review of interlocutory orders.* An interlocutory order of an administrative law judge will not be reviewed by the Commissioner except:

(1) when the administrative law judge shall be of the opinion (i) that the interlocutory order involves a controlling question of procedure or law as to which there is a substantial ground for a difference of opinion and (ii) that an immediate decision by the Commissioner may materially advance the ultimate termination of the

disciplinary proceeding or

(2) in an extraordinary situation where justice requires review.

(e) *Stays pending review of interlocutory order.* If the Director or a respondent seeks review of an interlocutory order of an administrative law judge under paragraph (b)(2) of this section, any time period set for taking action by the administrative law judge shall not be stayed unless ordered by the Commissioner or the administrative law judge.

§10.140 Representative for Director or respondent.

(a) A respondent may be represented before the Office in connection with an investigation or disciplinary proceeding by an attorney. The attorney shall file a written declaration that he or she is an attorney within the meaning of §10.1(c) and shall state:

(1) the address to which the attorney wants correspondence related to the investigation or disciplinary proceeding sent and

(2) a telephone number where the attorney may be reached during normal business hours.

(b) The Commissioner shall designate at least two associate solicitors in the Office of the Solicitor to act as representatives for the Director in disciplinary proceedings. In prosecuting disciplinary proceedings, the designated associate solicitors shall not involve the Solicitor or the Deputy Solicitor. The Solicitor and the Deputy Solicitor shall remain insulated from the investigation and prosecution of all disciplinary proceedings in order that they shall be available as counsel to the Commissioner in deciding disciplinary proceedings.

§10.141 Filing of papers.

(a) The provisions of §1.8 of this Subchapter do not apply to disciplinary proceedings.

(b) All papers filed after the complaint and prior to entry of an initial decision by the administrative law judge shall be filed with the administrative law judge at an address or place designated by the administrative law judge. All papers filed after entry of an initial decision by the administrative law judge shall be filed with the Director. The Director shall promptly forward to the Commissioner any paper which requires action under this part by the Commissioner.

(c) The administrative law judge or the Director may provide for filing papers and other matter by hand or by "Express Mail."

§10.142 Service of papers.

(a) All papers other than a complaint shall be served on a respondent represented by an attorney by:

(1) delivering a copy of the paper to the office of the attorney; or

(2) mailing a copy of the paper by first-class mail or "Express Mail" to the attorney at the address provided by the attorney under §10.140(a) (1); or

(3) any other method mutually agreeable to the attorney and a representative for the Director.

(b) All papers other than a complaint shall be served on a respondent who is not represented by an attorney by:

(1) delivering a copy of the paper to the respondent; or

(2) mailing a copy of the paper by first-class mail or "Express Mail" to the respondent at the address to which a complaint may be served or such other address as may be designated in writing by the respondent; or

(3) any other method mutually agreeable to the respondent and a representative of the Director.

(c) A respondent shall serve on the representative for the Director one copy of each paper filed with the administrative law judge or the Director. A paper may be served on the representative for the Director by:

(1) delivering a copy of the paper to the representative; or

(2) mailing a copy of the paper by first-class mail or "Express Mail" to an address designated in writing by the representative; or

(3) any other method mutually agreeable to the respondent and the representative.

(d) Each paper filed in a disciplinary proceeding shall contain therein a certificate of service indicating:

(1) the date on which service was made and

(2) the method by which service was made.

(e) The administrative law judge or the Commissioner may require that a paper be served by hand or by "Express Mail."

(f) Service by mail is completed when the paper mailed in the United States is placed into the custody of the U.S. Postal Service.

§10.143 Motions.

Motions may be filed with the administrative law judge. The adminstrative law judge will determine on a case-by-case basis the time period for response to a motion and whether replies to responses will be authorized. No motion shall be filed with the administrative law judge unless such motion is supported by a written statement by the moving party that the moving party or attorney for the moving party has conferred with the opposing party or attorney for the opposing party in an effort in good faith to resolve by agreement the issues raised by the motion and has been unable to reach agreement. If issues raised by a motion are resolved by the parties prior to a decision on the motion by the administrative law judge, the parties shall promptly notify the administrative law judge.

§10.144 Hearings.

(a) The administrative law judge shall preside at hearings in disciplinary proceedings. Hearings will be stenographically recorded and transcribed and the testimony of witnesses will be received under oath or affirmation. The administrative law judge shall conduct hearings in accordance with 5 U.S.C. 556. A copy of the transcript of the hearing shall become part of the record. A copy of the transcript shall be provided to the Director and the respondent at the expense of the Office.

(b) If the respondent to a disciplinary proceeding fails to appear at the hearing after a notice of hearing has been given by the administrative law judge, the administrative law judge may deem the respondent to have waived the right to a hearing and may proceed with the hearing in the absence of the respondent.

(c) A hearing under this section will not be open to the public except that the Director may grant a request by a respondent to open his or her hearing to the public and make the record of the disciplinary proceeding available for public inspection, *provided* agreement is reached in advance to exclude from public disclosure information which is privileged or confidential under applicable laws or regulations. If a disciplinary proceeding results in disciplinary action against a practitioner, and subject to §10.159(c), the record of the entire disciplinary proceeding, including any settlement agreement, will be available for public inspection.

§10.145 Proof; variance; amendment of pleadings.

In case of a variance between the evidence and the allegations in a complaint, answer, or reply, if any, the administrative law judge may order or authorize amendment of the complaint, answer, or reply to conform to the evidence. Any party who would otherwise be prejudiced by the amendment will be given reasonable opportunity to meet the allegations in the complaint, answer, or reply, as amended, and the administrative law judge shall make findings on any issue presented by the complaint, answer, or reply as amended.

§§10.146-10.148 [reserved]

§10.149 Burden of proof.

In a disciplinary proceeding, the Director shall have the burden of proving his or her case by clear and convincing evidence and a respondent shall have the burden of providing any affirmative defense by clear and convincing evidence.

§10.150 Evidence.

(a) *Rules of evidence.* The rules of evidence prevailing in courts of law and equity are not controlling in hearings in disciplinary proceedings. However, the administrative law judge shall exclude evidence which is irrelevant, immaterial, or unduly repetitious.

(b) *Depositions.* Depositions of witnesses taken pursuant to §10.151 may be admitted as evidence.

(c) *Government documents.* Official documents, records, and papers of the Office are admissible without extrinsic evidence of authenticity. These documents, records and papers may be evidenced by a copy certified as correct by an employee of the Office.

(d) *Exhibits.* If any document, record, or other paper is introduced in evidence as an exhibit, the administrative law judge may authorize the withdrawal of the exhibit subject to any conditions the administrative law judge deems appropriate.

(e) *Objections.* Objections to evidence will be in short form, stating the grounds of objection. Objections and rulings on objections will be a part of the record. No exception to the ruling is necessary to preserve the rights of the parties.

§10.151 Depositions.

(a) Depositions for use at the hearing in lieu of personal appearance of a witness before the administrative law judge may be taken by respondent or the Director upon a showing of good cause and with the approval of, and under such conditions as may be deemed appropriate by, the administrative law judge. Depositions may be taken upon oral or written questions, upon not less than ten days written notice to the other party, before any officer authorized to administer an oath or affirmation in the place where the deposition is to be taken. The requirement of ten days notice may be waived by the parties and depositions may then be taken of a witness and at a time and place mutually agreed to by the parties. When a deposition is taken upon written questions, copies of the written questions will be served upon the other party with the notice and copies of any written cross-questions will be served by hand or "Express Mail" not less then five days before the date of the taking of the deposition unless the parties mutually agree otherwise. A party on whose behalf a deposition is taken shall file a copy of a transcript of the deposition signed by a court reporter with the administrative law judge and shall serve one copy upon the opposing party. Expenses for a court reporter and preparing, serving, and filing depositions shall be borne by the party at whose instance the deposition is taken.

(b) When the Director and the respondent agree in writing, a deposition of any witness who will appear voluntarily may be taken under such terms and conditions as may be mutually agreeable to the Director and the respondent. The deposition shall not be filed with the administrative law judge and may not be admitted in evidence before the administrative law judge unless he or she orders the deposition admitted in evidence. The admissibility of the deposition shall lie within the discretion of the administrative law judge who may reject the deposition on any reasonable basis including the fact that demeanor is involved and that the witness should have been called to appear personally before the administrative law judge.

§10.152 Discovery.

Discovery shall not be authorized except as follows:

(a) After an answer is filed under §10.136 and when a party establishes in a clear and convincing manner that discovery is necessary and relevant, the administrative law judge, under such conditions as he or she deems appropriate, may order an opposing party to:

(1) answer a reasonable number of written requests for admission or interrogatories;

(2) produce for inspection and copying a reasonable number of documents; and

(3) produce for inspection a reasonable number of things other than documents.

(b) Discovery shall not be authorized under paragraph (a) of this section of any matter which:

(1) will be used by another party solely for impeachment or cross-examination;

(2) is not available to the party under 35 U.S.C. §122;

(3) relates to any disciplinary proceeding commenced in the Patent and Trademark Office prior to Mar. 8, 1985;

(4) relates to experts except as the administrative law judge may require under paragraph (e) of this section.

(5) is privileged; or

(6) relates to mental impressions, conclusions, opinions, or legal theories of any attorney or other representative of a party.

(c) the administrative law judge may deny discovery requested under paragraph (a) of this section if the discovery sought:

(1) will unduly delay the disciplinary proceeding;

(2) will place an undue burden on the party required to produce the discovery sought; or

(3) is available (i) generally to the public, (ii) equally to the parties; or (iii) to the party seeking the discovery through another source.

(d) Prior to authorizing discovery under paragraph (a) of this section, the administrative law judge shall require the party seeking discovery to file a motion (§10.143) and explain in detail for each request made how the discovery sought is necessary and relevant to an issue actually raised in the complaint or the answer.

(e) The administrative law judge may require parties to file and serve, prior to any hearing, a pre-hearing statement which contains

(1) A list (together with a copy) of all proposed exhibits to be used in connection with a party's case-in-chief,

(2) a list of proposed witnesses,

(3) as to each proposed expert witness:

(i) an identification of the field in which the individual will be qualified as an expert;

(ii) a statement as to the subject matter on which the expert is expected to testify; and

(iii) a statement of the substance of the facts and opinions to which the expert is expected to tesify,

(4) the identity of government employees who have investigated the case, and

(5) copies of memoranda reflecting respondent's own statements to administrative representatives.

(f) After a witness testifies for a party, if the opposing party requests, the party may be required to produce, prior to cross-examination, any written statement made by the witness.

§10.153 Proposed findings and conclusions; post-hearing memorandum.

Except in cases when the respondent has failed to answer the complaint, the administrative law judge, prior to making an initial decision, shall afford the parties a reasonable opportunity to submit proposed findings and conclusions and a post-hearing memorandum in support of the proposed findings and conclusions.

§10.154 Initial decision of administrative law judge.

(a) The administrative law judge shall make an initial decision in the case. The decision will include (a) a statement of findings and conclusions, as well as the reasons or basis therefore with appropriate references to the record, upon all the material issues of fact, law, or discretion presented on the record, and (b) an order of suspension or exclusion from practice, an order of reprimand, or an order dismissing the complaint. The administrative law judge shall file the decision with the Director and shall transmit a copy to the representative of the Director and to the respondent. In the absence of an appeal to the Commissioner, the decision of the administrative law judge will, without further proceedings, become the decision of the Commissioner of Patents and Trademarks thirty (30) days from the date of the decision of the administrative law judge.

(b) The initial decision of the administrative law judge shall explain the reason for any penalty of reprimand, suspension or exclusion. In determining any penalty, the following should normally be considered:

(1) the public interest;

(2) the seriousness of the violation of the Disciplinary Rule;

(3) the deterrent effects deemed necessary; and

(4) the integrity of the legal profession; and

(5) any extenuating circumstances.

§10.155 Appeal to the Commissioner.

(a) Within thirty (30) days from the date of the initial decision of the administrative law judge under §10.154, either party may appeal to the Commissioner. An appeal by the respondent will be filed with the Director in duplicate and will include exceptions to the decisions of the administrative law judge and supporting reasons for those exceptions. If the Director files the appeal, the Director shall serve a copy of the appeal. Within thirty (30) days after receipt of an appeal or copy thereof, the other party may file a reply brief in duplicate with the Director. If the Director files the reply brief, the Director shall serve a copy of the reply brief. Upon the filing of an appeal and a reply brief, if any, the Director shall transmit the entire record to the Commissioner.

(b) The appeal will be decided by the Commissioner on the record made before the administrative law judge.

(c) The Commissioner may order reopening of a disciplinary proceeding in accordance with the principles which govern the granting of new trials. Any request to reopen a disciplinary proceeding on the basis of newly discovered evidence must demonstrate that the newly discovered evidence could not have been discovered by due diligence.

§10.156 Decision of the Commissioner.

(a) An appeal from an initial decision of the administrative law judge shall be decided by the Commissioner. The Commissioner may affirm, reverse, or modify the initial decision or remand the matter to the administrative law judge for such further proceedings as the Commissioner may deem appropriate. Entry of a decision by the Commissioner is a final agency action in a disciplinary proceeding. In making a final decision, the Commissioner shall review the record or those portions of the record as may be cited by the parties in order to limit the issues. The Comissioner shall tranmit a copy of the final decision to the Director and to the respondent.

(b) A final decision of the Commissioner may dismiss a disciplinary proceeding, reprimand a practitioner, or may suspend or exclude the practitioner from practice before the Office.

§10.157 Review of Commissioner's final decision.

(a) Review of the Commissioner's final decision in a disciplinary case may be had by a petition filed in the United States District Court for the District of Columbia. See 35 U.S.C. 32 and Local Rule 1-26 of the United States District Court for the District of Columbia.

(b) The Commissioner may stay a final decision pending review of the Commissioner's final decision.

§10.158 Suspended or excluded practitioner.

(a) A practitioner who is suspended or excluded from practice before the Office under §10.156(b) shall not engage in unauthorized practice of patent, trademark and other non-patent law before the Office.

(b) Unless otherwise ordered by the Commissioner, any practitioner who is suspended or excluded from practice before the Office under §10.156(b) shall:

(1) Within 30 days of entry of the order of suspension or exclusion, notify all bars of which he or she is a member and all clients of the practitioner for whom he or she is handling matters before the Office in separate written communications of the suspension or exclusion and shall file a copy of each written communication with the Director.

(2) Within 30 days of entry of the order of suspension or exclusion, surrender a client's active Office case files to (i) the client or (ii) another practitioner designated by the client.

(3) Not hold himself or herself out as authorized to practice law before the Office.

(4) Promptly take any necessary and appropriate steps to remove from any telephone, legal, or other directory any advertisement, statement, or representation which would reasonably suggest that the practitioner is authorized to practice patent, trademark or other non-patent law before the Office, and within 30 days of taking those steps, file with the Director an affidavit describing the precise nature of the steps taken.

(5) Not advertise the practitioner's availability or ability to perform or render legal services for any person having immediate, prospective, or pending business before the Office.

(6) Not render legal advice or services to any person having immediate, prospective, or pending business before the Office as to that business.

(7) Promptly take steps to change any sign identifying a practitioner's or the practitioner's firm's office and the practitioner's or the practitioner's firm's stationary to delete therefrom any advertisement, statement, or representation which would reasonably suggest that the practitioner is authorized to practice law before the Office.

(8) Within 30 days, return to any client any unearned funds, including any unearned retainer fee, and any securities and property of the client.

(c) A practitioner who is suspended or excluded from practice before the Office and who aides another practitioner in any way in the other practitioner's practice of law before the Office, may, under the direct supervision of the other practitioner, act as a para-legal for the other practitioner or perform other services for the other practitioner which are normally performed by lay-persons, *provided:*

(1) the practitioner who is suspended or excluded is:

(i) a salaried employee of:

(A) the other practitioner;

(B) the other practitioner's law firm; or

(C) a client-employer who employs the other practitioner as a salaried employee;

(2) the other practitioner assumes full professional responsibility to any client and the Office for any work performed by the suspended or excluded practitioner for the other practitioner;

(3) the suspended or excluded practitioner, in connection with any immediate, prospective, or pending business before the Office, does not:

(i) communicate directly in writing, orally, or otherwise with a client of the other practitioner;

(ii) render any legal services to a client of the other practitioner; or

(iii) meet in person or in the presence of the other practitioner with:

(A) any Office official in connection with the prosecution of any patent, trademark, or other case;

(B) any client of the other practitioner, the other practioner's law firm, or the client-employer of the other practitioner;

(C) any witness or potential witness which the other practitioner, the other practitioner's law firm, or the other practitioner's client-employer may or intends to call as a witness in any proceeding before the Office. The term "witness" includes individuals who will testify orally in a proceeding before, or sign an affidavit or any other document to be filed in, the Office.

(d) When a suspended or excluded practitioner acts as a para-legal or performs services under paragraph (c) of this section, the suspended or excluded practitioner shall not thereafter be reinstated to practice before the Office unless:

(1) the suspended or excluded practitioner shall have filed with the Director an affidavit which (i) explains in detail the precise nature of all para-legal or other services performed by the suspended or excluded practitioner and (ii) shows by clear and convincing evidence that the suspended or excluded practitioner has complied with the provisions of this section and all Disciplinary Rules, and

(2) the other practitioner shall have filed with the Director a written statement which (i) shows that the other practitioner has read the affidavit required by subparagraph (d) (1) of this section and that the other practitioner believes every statement in the affidavit to be true and (ii) states why the other practitioner believes that the suspended or excluded practitioner has complied with paragraph (c) of this section.

§10.159 Notice of suspension or exclusion.

(a) Upon issuance of a final decision reprimanding a practitioner or suspending or excluding a practitioner from practice before the Office, the Director shall give notice of the final decision to appropriate employees of

the Office and to interested departments, agencies, and courts of the United States. The Director shall also give notice to appropriate authorities of any State in which a practitioner is known to be a member of the bar and any appropriate bar association.

(b) The Director shall cause to be published in the *Official Gazette* the name of any practitioner suspended or excluded from practice. Unless otherwise ordered by the Commissioner, the Director shall publish in the *Official Gazette* the name of any practitioner reprimanded by the Commissioner.

(c) The Director shall maintain records, which shall be available for public inspection, of every disciplinary proceeding where a practitioner is reprimanded, suspended, or excluded unless the Commissioner orders that the proceeding be kept confidential.

§10.160 Petition for reinstatement.

(a) A petition for reinstatement of a practitioner suspended for a period of less than five years will not be considered until the period of suspension has passed.

(b) A petition for reinstatement of a practitioner excluded from practice will not be considered until five years after the effective date of the exclusion.

(c) An individual who has resigned under §10.133 or who has been suspended or excluded may file a petition for reinstatement. The Director may grant a petition for reinstatement when the individual makes a clear and convincing showing that the individual will conduct himself or herself in accordance with the regulations of this part and that granting a petition for reinstatement is not contrary to the public interest. As a condition to reinstatement, the Director may require the individual to:

(1) meet the requirements of §10.7, including taking and passing an examination under §10.7(b) and

(2) pay all or a portion of the costs and expenses, not to exceed $1,500, of the disciplinary proceeding which lead to suspension or exclusion.

(d) Any suspended or excluded practitioner who has violated the provisions of §10.158 during his or her period of suspension or exclusion shall not be entitled to reinstatement until such time as the Director is satisfied that a period of suspension equal in time to that ordered by the Commissioner or exclusion for five years has passed during which the suspended or excluded practitioner has complied with the provisions of §10.158.

(e) Proceedings on any petition for reinstatement shall be open to the public. Before reinstating any suspended or excluded practitioner, the Director shall publish in the *Official Gazette* a notice of the suspended or excluded practitioner's petition for reinstatement and shall permit the public a reasonable opportunity to comment or submit evidence with respect to the petition for reinstatement.

§10.161 Savings clause.

(a) A disciplinary proceeding based on conduct engaged in prior to the effective date of these regulations may be instituted subsequent to such effective date, if such conduct would continue to justify suspension or exclusion under the provisions of this part.

(b) No practitioner shall be subject to a disciplinary proceeding under this part based on conduct engaged in before the effective date hereof if such conduct would not have been subject to disciplinary action before such effective date.

§10.162-10.169 [reserved]

§10.170 Suspension of rules.

(a) In an extraordinary situation, when justice requires, any requirement of the regulations of this part which is not a requirement of the statutes may be suspended or waived by the Commissioner or the Commissioner's designee, *sua sponte*, or on petition of any party, including the Director or the Director's representative, subject to such other requirements as may be imposed.

(b) Any petition under this section will not stay a disciplinary proceeding unless ordered by the Commissioner or an administrative law judge.

GERALD J. MOSSINGHOFF
Commissioner of Patents and Trademarks

Dec. 21, 1984.

PATENT NOTICES

Certificates of Correction for the Week of Mar. 5, 1985

Pp.5,241	4,428,056	4,457,478	4,466,465
Re. 31,535	4,428,945	4,457,772	4,466,619
D. 265,195	4,429,836	4,457,984	4,466,621
4,062,968	4,431,982	4,458,092	4,466,706
4,084,441	4,432,375	4,458,096	4,466,828
4,189,524	4,432,586	4,458,303	4,466,901
4,211,645	4,433,986	4,458,325	4,466,979
4,230,862	4,434,347	4,458,337	4,467,106
4,264,269	4,435,499	4,458,882	4,467,182
4,283,329	4,435,765	4,459,192	4,467,406
4,310,140	4,436,655	4,459,399	4,467,569
4,329,985	4,436,760	4,459,879	4,467,890
4,339,508	4,438,043	4,460,482	4,467,942
4,350,582	4,438,676	4,461,222	4,468,114
4,359,027	4,439,630	4,461,255	4,468,197
4,359,455	4,441,444	4,461,874	4,468,279
4,364,511	4,441,594	4,461,876	4,468,460
4,365,756	4,441,642	4,462,138	4,468,556
4,366,308	4,442,079	4,462,146	4,468,576
4,368,976	4,442,326	4,462,223	4,468,930
4,372,926	4,442,506	4,462,594	4,468,976
4,375,380	4,443,255	4,462,644	4,469,868
4,376,698	4,444,466	4,463,117	4,470,015
4,380,209	4,445,335	4,463,186	4,470,373
4,381,305	4,445,693	4,463,311	4,470,467
4,382,620	4,445,861	4,463,543	4,470,694
4,389,484	4,446,270	4,463,684	4,471,250
4,389,899	4,447,421	4,463,755	4,471,514
4,390,834	4,447,745	4,463,790	4,471,680
4,394,080	4,448,200	4,463,913	4,471,790
4,394,541	4,448,208	4,463,957	4,471,792
4,398,178	4,448,663	4,464,013	4,471,863
4,399,152	4,450,530	4,464,091	4,472,062
4,402,280	4,450,602	4,464,093	4,472,103
4,404,254	4,451,136	4,464,144	4,472,398
4,409,679	4,451,478	4,464,311	4,472,866
4,412,068	4,451,805	4,464,581	4,473,025
4,412,927	4,452,240	4,465,095	4,473,202
4,414,800	4,452,641	4,465,189	4,473,446
4,414,987	4,453,359	4,465,190	4,473,513
4,415,331	4,454,295	4,465,194	4,473,789
4,416,341	4,455,063	4,465,224	4,473,824
4,420,730	4,455,094	4,465,471	4,473,971
4,422,026	4,455,786	4,465,528	4,474,094
4,422,993	4,455,817	4,465,587	4,474,132
4,423,938	4,456,302	4,465,605	4,474,275
4,424,716	4,456,767	4,465,729	4,474,347
4,425,027	4,456,770	4,465,784	4,474,380
4,426,788	4,457,155	4,465,894	4,474,382
4,426,842	4,457,175	4,466,095	4,474,435
4,427,974	4,457,285	4,466,433	4,486,909

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext.21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 264-4481
Arizona	Tempe: Science Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 738-5580
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware	(302) 738-2238
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 579-5001
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1706
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4283
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 930-0850
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Cambridge Springs: Alliance College Library	(814) 398-2098
	Philadelphia: Franklin Institute Library	(215) 448-1227
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina	(803) 792-2372
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
Texas	Austin: McKinney Engineering Library, University of Texas.	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 749-4176
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF January 19, 1985

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-25-83
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	6-01-83
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	5-02-83
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-24-83
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDEBERG, Director	8-01-81
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-12-80
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	1-12-81
RECEPTACLES, CLEANING, WINDING, AND MEASURING, GROUP 240—G. M. FORLENZA, Director	5-03-83
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director	10-01-80
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	2-13-80
DESIGN, GROUP 290—K. L. CAGE, Director	9-23-82
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	1-17-83
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	3-19-83
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-29-82
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	12-21-81
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	12-04-81

Expiration of patents: The patents within the range of numbers indicated below expire during January 1985, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,360,800 to 3,366,969, inclusive

Plant Patents . . . . . Numbers 2,784 to 2,793 inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED MARCH 5, 1985

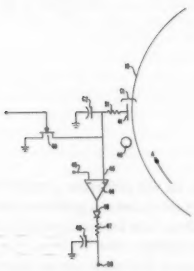
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T105,201
DOCUMENT DETECTOR

Robert W. Pries, 1424 Frontier St., Longmont, Colo. 80501, and Henry W. Simpson, 3201 Tabago Ct., Lexington, Ky. 40511

Continuation of Ser. No. 158,844, Jun. 12, 1980, abandoned.
This application Jun. 14, 1982, Ser. No. 387,740
Int. Cl.³ G03G *15/22*
U.S. Cl. 355—14 SH
3 Sheets Drawing. 20 Pages Specification



An electrophotographic document copier machine of the transfer type where a detector is positioned subsequent to a detach station to sense whether copy receiving material has been successfully detached from the photoreceptive surface. The detector is comprised of a light source **40** to discharge the photoreceptive material **19** to a repeatable low level and an electrostatic probe **41** to sense that low level. When an unsuccessful detach operation occurs, the probe **41** senses the much higher voltage level present on the back side of copy receiving material which has passed under a transfer corona charge generator prior to reaching the detach station and light source **40**.

T105,202
PROCESS FOR PREPARING WATER DISSIPATABLE POLYESTER AND USE THEREOF

Kenneth R. Barton, 201 Claymore Dr., Kingsport, Tenn. 37663

Filed Jul. 20, 1984, Ser. No. 632,929
Int. Cl.³ B32B *27/34, 27/36*
U.S. Cl. 428—395
No Drawing. 21 Pages Specification

Disclosed is the preparation of water-dissipatable polyesters and polyesteramides wherein at least a part of one of the monomeric components from which it is derived is a polycarboxylic acid or polyhydric alcohol which contains a sulfonic acid salt moiety derived from a nitrogen-containing base having an ionization constant in water at 25° C. of 10^{-3} to 10^{-10}. Also disclosed is the use of such polymers as sizes for fibers of glass, ceramics, etc., where the size is removed by burning and little or no ash residue is important.

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

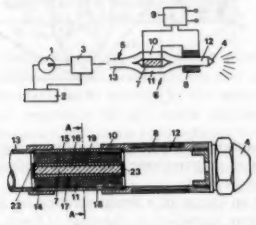
Re. 31,841
ATOMIZER BURNER FOR OIL FIRING PLANT

Ingvard M. Madsen, Sonderborg, and Niels I. Andersen, Hordborg, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Original No. 4,354,822, dated Oct. 19, 1982, Ser. No. 146,795, May 5, 1980. Application for reissue Apr. 11, 1983, Ser. No. 483,725

Int. Cl.[3] **F23D** *11/44*

U.S. Cl. 431—208 **12 Claims**



1. An atomizer burning assembly for an oil burner comprising, conduit means providing a conduit for transporting a fluid, said conduit means having internal wall surface means contactable by said fluid and external wall surface means isolated from said fluid, an atomizer nozzle attached to the outlet end of said conduit means, electrical circuit means including power means connected in series with a heating element and a PTC resistor element, said elements being in heat transmitting contact with said external wall surface means with said PTC resistor element being upstream relative to said heating element to control the heat generated by said heating element in accordance with the temperature of said fluid to maintain a substantially constant temperature for said fluid.

12. An atomizing burner for an oil firing plant comprising fluid conduit means having an inlet and an outlet linearly displaced relative to each other, an atomizer nozzle, means connecting said nozzle and said outlet forming a liquid oil chamber therebetween for providing fluid communication between said nozzle and said outlet, elongated rectangularly shaped PTC heating resistor means in said conduit means between and linearly aligned with said inlet and said outlet, said PTC resistor means having a pair of parallel sides of greater width than the thickness of said resistor means, electrodes connected to said sides, power means connected to said electrodes, said conduit means having heat transfer means for transferring heat from said PTC resistor means to oil flowing in said conduit means, said heat transfer means including flattened parallel conduit sections sandwiching said PTC resistor means therebetween and being in effective heat transmitting relation to said PTC resistor means parallel sides, said parallel conduit sections having unimpeded cross sections to facilitate the flowing of oil uniformly therethrough, and said parallel conduit section being packed with efficient heat conductive means with the form of metal balls.

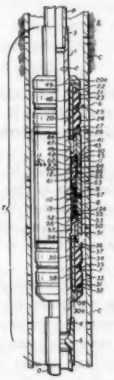
Re. 31,842
WELL WASHING TOOL AND METHOD

Robert D. Weitz, Houma, La., assignor to Top Tool Company, Inc., Houma, La.

Original No. 4,279,306, dated Jul. 21, 1981, Ser. No. 65,520, Aug. 10, 1979. Application for reissue Sep. 3, 1982, Ser. No. 414,619

Int. Cl.[3] **E21B** *37/00, 33/124*

U.S. Cl. 166—312 **22 Claims**



20. A well washing tool comprising:

a tubular mandrel having a flow passage therethrough and the upper end of which is provided with means for connecting said tool in a pipe string extending to the surface of a well and the lower end of which may be provided with means for blocking flow of fluids from said pipe string through said mandrel flow passage;

an outer tubular body surrounding said mandrel;

an annular chamber between said mandrel and said surrounding tubular body, said annular chamber being in fluid communication with said mandrel flow passage through first port means provided in the walls of said mandrel, said tubular body being provided with second port means permitting fluid communication between said annular chamber and the exterior of said tool;

first and second packer assemblies carried on said mandrel at opposite ends thereof, each of said packer assemblies comprising a tubular packer body carried by said mandrel having an annular shoulder thereon, at least one resilient packer element surrounding each said packer body adjacent said annular shoulder and each said packer assembly having an annular piston member with an annular head portion from which extends a tubular sleeve portion, an inner surface of said annular head portion slidingly and sealingly engaging the exterior of said tubular mandrel and an outer surface of which sealingly engages the interior of said tubular body, said inner and outer surfaces being joined by an annular end surface which is exposed to fluid pressure within said annular chamber so that said piston member is responsive to predetermined pressure communicated to said annular chamber through said first port means to move said packer elements toward said annular shoulder axially compressing said packer elements therebetween for sealing against surrounding surfaces within said well, said first port means, said annular chamber, and said second port means then providing fluid communication for flow of fluids from said mandrel to the

exterior of said tool between said first and second packer assemblies.

Re. 31,843

FLAME RETARDANT COMPOSITIONS

Maynard G. Noble, Troy, and James R. Brower, Latham, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Original No. 3,514,424, dated May 26, 1970, Ser. No. 830,191, May 14, 1969. Continuation of Ser. No. 129,323, Mar. 11, 1980, , which is a continuation of Ser. No. 463,898, Jun. 14, 1965,. Application for reissue Aug. 28, 1981, Ser. No. 297,211

Int. Cl.³ C08K *9/06*

U.S. Cl. 523—212 **34 Claims**

12. A composition of matter which in a cured state exhibits improved flame-retardant properties, the composition comprising:

(1) 100 parts of an organopolysiloxane gum convertible to the cured, solid, elastic state and consisting essentially of silicon atoms, oxygen atoms, and organic groups selected from the class consisting of methyl radicals, aromatic radicals selected from the class consisting of aryl and halogenated aryl radicals in an amount of from 0 to 35 mol percent of the organic groups, and from 0 to 2 mol percent of the total organic groups of vinyl radicals, there being from 1.98 to 2.05 organic groups per silicon atoms,

(2) a finely divided, non-alkaline inorganic filler in an amount of from 10 to 300 parts, by weight,

(3) a peroxide curing agent, and

(4) small, but effective amount to impart flame retardancy of a platinum containing material not exceeding 250 parts per million, by weight based on the organopolysiloxane gum.

Re. 31,844

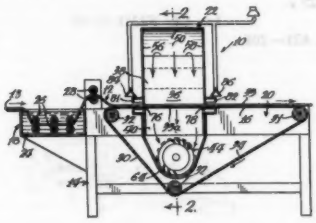
METHOD OF APPLYING MODIFYING INGREDIENTS TO OPEN-CELLED POLYURETHANE MATERIAL

Winslow L. Pettingell, Wooddale, Ill., assignor to Foam Cutting Engineers, Inc., Addison, Ill.

Original No. 4,073,979, dated Feb. 14, 1978, Ser. No. 697,065, Jun. 17, 1976. Application for reissue Oct. 26, 1983, Ser. No. 545,482

Int. Cl.³ B05D *3/12, 5/00*

U.S. Cl. 427—244 **11 Claims**



1. The method of applying a modifying ingredient to a mass of open-celled polyurethane foam, said method comprising the consecutive steps of:

applying an excess of a liquid solution or dispersion of said modifying ingredient to the mass of foam, said liquid being inert with respect to said foam;

squeezing the mass to remove most of said excess;

thereafter [passing] *creating a suction to pass* heated gaseous material entirely through the mass containing the remainder of said liquid solution or dispersion to rapidly raise the temperature of the entire mass, the temperature of said gaseous material being in the range of 350° F. to 500° F., said temperature being at least as high as the vaporization temperature of the liquid under the ambient condition of operation, the gaseous material being inert with respect to the polyurethane, the modifying ingredient and the liquid, and the period of exposure of the mass to the gaseous material being insufficient to allow charring of the foam, whereby the liquid is vaporized and the modifying ingredient is effectively simultaneously incorporated into the foam in a very short time;

and permitting the mass to cool.

PLANT PATENTS

GRANTED MARCH 5, 1985

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

5,410

CARNATION PLANT

Leonard E. Carrier, 1911 Sheridan Rd., Encinitas, Calif. 92024

Filed Jun. 22, 1983, Ser. No. 525,601

Int. Cl.[3] **A01H** *5/00*

U.S. Cl. Plt.—70 **1 Claim**

1. A new and distinct cultivar of carnation plant named, Carrier's Fiesta, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of superior resistance to soil-borne diseases; large, slightly serrated flowers which open fully without bursting the calyx and causing "splits"; a distinctive and attractive pink-orange flower color which fades evenly and beautifully; a very vigorous and free-breaking plant habit; strong and straight stems; and good heat tolerance which is superior to that of the parent lines and the commercial standard, the so-called "Sim".

5,411

ROSE PLANT KORAMPA OF THE FLORIBUNDA CLASS

Reimer Kordes, Sparrieshoop, Fed. Rep. of Germany, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Apr. 15, 1983, Ser. No. 485,278

Int. Cl.[3] **A01H** *5/00*

U.S. Cl. Plt.—24 **1 Claim**

1. A new and distinct variety of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its pale orange-ivory flower color, heavy textured petals, large foliage, resistance to rose powdery mildew, few thorns, straight stems and slight fragrance.

5,412

PEAR TREE

Lyle A. Brooks, Forest Grove, Oreg., assignor to Carlton Nursery Company, Inc., Dayton, Oreg.

Filed Sep. 20, 1983, Ser. No. 534,177

Int. Cl.[3] **A01H** *5/03*

U.S. Cl. Plt.—36 **1 Claim**

1. A new and distinctive variety of pear tree referred to by the cultivar designation Old Home × Farmingdale #40 and substantially as herein shown and described characterized particularly by its ability to serve as a size-controlling rootstock for grafting of pear tree cultivars to produce "dwarf" pear trees; further characterized by its resistance to the Fireblight disease and its tolerance of the Pear Decline disease; further characterized by its non-rootsuckering habit, its hardiness, its good root-anchorage, its good graft-compatibility with all major commercial pear varieties, its early bearing habit, and its ability to root easily and reproduce readily by hard and softwood cuttings.

PATENTS

GRANTED MAR. 5, 1985

ERRATA

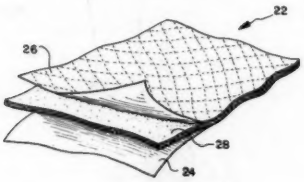
For CLASS	See PATENT NO.
033–174	4,502,232
033–181	4,502,233
081–177	4,502,365
280–446	4,502,561
296–037	4,502,674
384–477	4,502,738
384–481	4,502,739
029–148	4,502,740
514–010	4,503,043
514–002	4,503,044
514–025	4,503,045
514–040	4,503,046
514–080	4,503,049
514–222	4,503,050
514–183	4,503,051
514–210	4,503,052
514–239	4,503,053
514–242	4,503,054
514–255	4,503,055
514–252	4,503,056
514–269	4,503,057
514–214	4,503,058
514–326	4,503,059
514–214	4,503,060
514–338	4,503,061
514–383	4,503,062
514–383	4,503,063
548–210	4,503,064
514–396	4,503,065
514–409	4,503,066
514–411	4,503,067
514–412	4,503,068
514–469	4,503,069
514–494	4,503,070
514–521	4,503,071
514–529	4,503,072
514–539	4,503,073
514–547	4,503,074
514–622	4,503,075
514–631	4,503,076
427–428	4,503,100
426–438	4,503,127
524–159	4,503,191
549–320	4,503,218
514–544	4,503,244
310–049	4,503,368
333–021	4,503,379
340–573	4,503,399

PATENTS

GRANTED MARCH 5, 1985

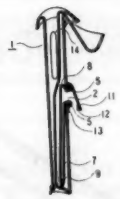
GENERAL AND MECHANICAL

4,502,153
APPAREL LINER
Richard W. Lapedes, Dayton, and James H. Veghte, Beavercreek, both of Ohio, assignors to Lion Uniform, Inc., Dayton, Ohio
Filed Aug. 30, 1982, Ser. No. 412,661
Int. Cl.[3] A41D *11/00*
U.S. Cl. 2—81 **26 Claims**



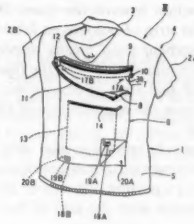
1. In a piece of fire fighter's apparel, including an outer shell of fabric material constructed to cover at least a portion of the human body, and a thermal liner attached to said outer shell and lining the interior thereof, the improved thermal liner comprising:
a first vapor barrier layer of substantially moisture impermeable material adjacent the inner surface of said outer shell,
a second vapor barrier layer of substantially moisture impermeable material, and
a layer of fibrous thermal insulating material, positioned between said first and second vapor barrier layers, whereby said first vapor barrier layer prevents wetting of said layer of thermal insulating material by moisture penetrating said outer shell, and said second vapor barrier layer prevents wetting of said layer of thermal insulating material by sweat from a wearer.

4,502,154
OUTERWEAR AND BAG IN ONE
Toru Itoi, 861-11, Komatsuri-Cho, Kishiwada-Shi, Osaka, Japan
Filed Apr. 25, 1983, Ser. No. 488,069
Int. Cl.[3] A41B *9/00*
U.S. Cl. 2—108 **9 Claims**



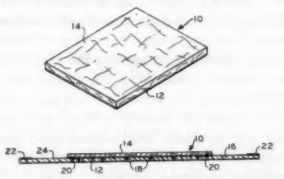
1. A combined garment and bag, comprising:
a garment having a back portion;
a pocket having an open upper end secured to the inner side of said back portion;
a horizontal slit on said back portion communicating with said upper end of said pocket;
loops surrounding said slit;
strings in said loops for closing said slit;
spaced fastening means at the lower end of said pocket; and
complementary fastening means at the ends of said strings for carrying said combined garment and bag as a knapsack or shouldering the same by tying the ends of said strings together.

4,502,155
OUTERWEAR AND BAG IN ONE
Toru Itoi, 861-11, Komatsuri-Cho, Kishwada-Shi, Osaka, Japan
Filed Jun. 21, 1982, Ser. No. 390,306
Int. Cl.[3] A41B *1/00*
U.S. Cl. 2—115 **11 Claims**



1. In combination, an outer garment including a back portion having an outer surface and an inner surface; an open top bag secured at its top outside the back portion of said garment on said outer surface at the shoulder area thereof;
straps having their upper ends secured to the left and right sides, respectively, on the inner surface of said back portion near the upper end thereof and the opening of said bag;
said bag having an open edge side; through-holes on said open edge side of said bag; and said straps having free ends insertable in said through-holes;
engaging members on said free ends of said straps; and
complementary engaging means on the left and right sides at the lower part of the inner surface of said back portion, whereby both arms may be passed through said straps when said garment is folded into said bag, or said bag may be shouldered with said garment therein by connecting said free ends of said straps after passing them through said holes.

4,502,156
APPARATUS FOR ABSORBING MOISTURE
Marvin Wishman, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Division of Ser. No. 260,473, May 4, 1981, , which is a continuation of Ser. No. 844,350, Oct. 21, 1977, abandoned. This application Nov. 30, 1983, Ser. No. 556,675
Int. Cl.[3] A42C *5/02*
U.S. Cl. 2—181 **9 Claims**



1. Moisture-absorbent band means suitable for use within the

crown of a hat or the like for removing moisture from the skin, comprising:

a strip of nonwoven fabric including a plurality of staple polypropylene fibers, a first portion of said fibers being unfused on a first side of said fabric and forming liquid-pervious unfused fiber facing means for engaging a liquid-bearing surface and adapted to be positioned in moisture-conducting communication with the skin, and a second portion of said fibers being fused on the opposite side of said fabric separated from the liquid-bearing surface by said first portion of said fibers and adapted to be spaced from the skin by said unfused fibers, whereby liquid adsorbed by said liquid-pervious unfused fiber facing means, in the form of moisture from the skin contacting said unfused fibers, migrates through said unfused fibers by wicking action toward the fused fibers on the opposite side of said strip of nonwoven fabric;

moisture-absorbent strip means disposed in moisture-conducting communication with the fused fibers on the opposite side of said strip of nonwoven fabric for absorbing moisture from the opposite side of said strip of nonwoven fabric; and

means operatively related to said strip of nonwoven fabric for maintaining said liquid-pervious unfused fiber facing means about a portion of a wearer in moisture-conducting communication with the skin of the wearer.

4,502,157

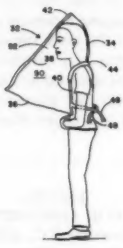
PROTECTIVE ENCLOSURES HAVING SELF-CONTAINED AIR SUPPLY

Albert H. Wong, Los Angeles, Calif., assignor to Wong Technology, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 226,920, Jan. 21, 1981,. This application May 27, 1981, Ser. No. 267,505

Int. Cl.³ A42B *1/04*

U.S. Cl. 2—202 **11 Claims**



1. A flexible, gas-tight protective enclosure to be worn over at least the head and some of the chest of a wearer within a contaminated environment to provide the wearer with a temporary supply of air from which to breathe, said enclosure having an opened end for receipt therethrough of the wearer's head and chest and a closed end to be spaced away from the wearer's head and chest and disposed forward of said closed end, said opened end having walls of flexible construction and associated fastening means by which to make a gas-tight closure of said opened end against the chest of the wearer, such that an airspace containing the temporary supply of air is provided between the wearer's chest and said closed enclosure end and around the wearer's head, said gas-tight enclosure isolating the wearer's head within said airspace from fluid communication with the contaminated environment exterior of said enclosure to permit the wearer of said enclosure to breathe while within the contaminated environment.

4,502,158

SLIP DOWN-FREE SOCKS WITH A GARTER

Masami Mouri, 548 Hirao Ooaza Koryo-cho, and Fumio Uemura, 271-1 Mitsuyoshi Ooaza Koryo-cho, both of Kitakatsuragi-gun, Nara, Japan

Filed Nov. 4, 1982, Ser. No. 439,719

Claims priority, application Japan, Nov. 11, 1981, 56-181525

Int. Cl.³ A41B *11/00*

U.S. Cl. 2—240 **3 Claims**

1. A sock, comprising:

a lower portion for covering at least the foot and ankle of the wearer;

a leg portion above the lower portion having a front upper end and a rear upper end for respectively covering the shin and lower end of the calf of the wearer;

a loop-shaped welt portion connected to said front upper end of said leg portion along an upper front edge of said front upper end so as to encircle the wearer's leg above the calf and hold said sock up; and

a garter portion formed of a netting having more elasticity than that of said leg portion, having an upper edge fixed to said welt portion along the entire rear lower edge of said belt portion and having a lower edge fixed to said rear upper end of said leg portion along the entire upper rear edge of said leg portion so as to substantially completely cover the upper portion of the calf of the wearer, whereby the calf of the wear is not exposed.

4,502,159

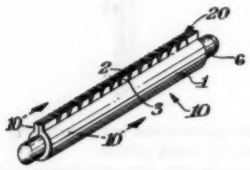
TUBULAR PROSTHESES PREPARED FROM PERICARDIAL TISSUE

E. Aubrey Woodroof, Fountain Valley, and Philip S. Yang, Irvine, both of Calif., assignors to Shiley Incorporated, Irvine, Calif.

Filed Aug. 12, 1982, Ser. No. 407,529

Int. Cl.³ A61F *1/00*

U.S. Cl. 3—1.4 **4 Claims**



1. A tubular vascular prosthesis comprising a sheet of pericardial tissue having opposing longitudinal edges sewn together by means including a continuous biocompatible thread to form an everted longitudinal seam along the length of said prosthesis, said thread being disposed in a configuration of stitches extending continuously along said seam

and with each of said stitches being separately secured with

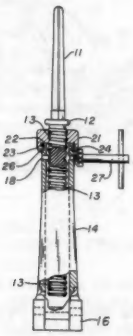
a knot tied in said thread after said stitch so as to permit said prosthesis to be cut transversely to a determined length at any point between its ends without exposing unsecured free thread ends and thereby substantially damaging the seam.

4,502,160

ADJUSTABLE LENGTH PROSTHETIC JOINT IMPLANT

William A. Moore, Germantown, Tenn., and Michael M. Lewis, New York, N.Y., assignors to Dow Corning Wright, Arlington, Tenn.

Filed Oct. 27, 1983, Ser. No. 546,006
Int. Cl.³ A61F *1/00*
U.S. Cl. 3—1.9 **5 Claims**



1. An adjustable length prosthetic joint implant comprising:

a stem having a first portion adapted for implantation in the intramedullary canal of a bone adjacent the joint, an intermediate portion adapted to overlie at least a portion of the bone end and a threaded portion;

a sleeve overlying at least a portion of the threaded portion of the stem in one end thereof and having affixed thereto at the end opposite the stem an articulating component of the joint,

rotation restraining means interconnecting the stem and the sleeve for preventing relative rotation therebetween but allowing axial relative movement, said rotation restraining means comprising a logitudinal slot in the portion of the stem which is adapted to be positioned inside the sleeve and a pin member extending through the sleeve and into the slot; and

length adjustment means rotatably engaged with the threads on the stem and axially fixed relative to the sleeve whereby rotation of the length adjustment means controls the portion of length of the stem which protrudes from the sleeve.

4,502,161

PROSTHETIC MENISCUS FOR THE REPAIR OF JOINTS

W. H. Wall, 2300 Henderson Mill, Atlanta, Ga. 30345

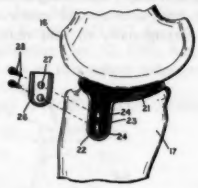
Continuation of Ser. No. 303,826, Sep. 21, 1981, abandoned. This application Aug. 19, 1983, Ser. No. 524,474
Int. Cl.³ A61F *1/24*
U.S. Cl. 3—1.91 **13 Claims**

1. A prosthetic meniscus for placement within a joint capsule comprising:

a resilient insert shaped to be received within the joint capsule to provide at least substantially the same area of bearing surface as the natural meniscus and defining an extension thereof for extending outside the joint capsule;

reinforcing mesh embedded within said resilient insert and integrally extending into said extension; and

means for fixedly attaching the extending end of said extension to an outer bone surface outside the joint capsule; said



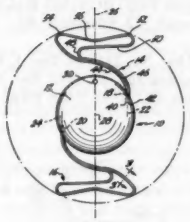
extension being connected to said insert so as to permit relative movement between said insert and said extension.

4,502,162

HAPTIC FOR INTRAOCULAR LENS

Gregory J. Gerhard, Seattle; Robert J. Gornstein, Dockton; William M. Graham, Burton; Anilbhai S. Patel, Seattle; John M. Smith, Vashon Island, and Wade C. Vaughn, Seattle, all of Wash., assignors to CooperVision, Inc., Palo Alto, Calif.

Filed Oct. 7, 1983, Ser. No. 539,850
Int. Cl.³ A61F *1/16, 1/24*
U.S. Cl. 3—13 **13 Claims**



1. An intraocular lens for placement in the eye comprising:

an optic having an optical axis and an inferior-superior axis intersecting said optical axis, said optic having at least one haptic receiving channel therein, said channel extending inwardly from the periphery of said optic and having a longitudinal axis oriented substantially parallel to and offset to one side of said inferior-superior axis, and

at least one flexible haptic having first and second ends mounted in said channel and extending outwardly therefrom, said haptic having a first leg joined to said first end, a heel joined to said first leg, a second leg joined to said second end, a bridge and a knee joining said second end to one end of said bridge, a toe joined to the other end of said bridge, and an arch connecting said heel and said toe, said heel and said toe being spaced radially outwardly from the periphery of said optic, said heel and toe being eye contacting portions of said haptic, said toe being on one side of said inferior-superior axis, said heel and knee being positioned on the other side of said inferior-superior axis.

4,502,163

HAPTIC FOR INTRAOCULAR LENS

William M. Graham, Burton, Wash., assignor to Cooper Vision, Inc., Palo Alto, Calif.

Filed Oct. 7, 1983, Ser. No. 539,997
Int. Cl.³ A61F *1/16, 1/24*
U.S. Cl. 3—13 **13 Claims**

1. An intraocular lens for placement in the eye comprising:

an optic having an optical axis extending through the central portion thereof, said optic having a channel therein extending inwardly from the periphery thereof; and,

at least one haptic, said haptic being flexible, at least a por-

tion of said haptic having an asymmetrical cross section, said haptic in cross section having a major axis and a minor axis, said major axis being oriented generally parallel to said optical axis, said minor axis being oriented generally orthogonally to said major axis, said haptic

having first and second ends, said first end being inserted in said channel, said haptic extending outwardly from said first end and the periphery of said optic to form an eye contacting portion and, thereafter, extending inwardly toward said periphery and said second end, said second end being juxtaposed said first end in said channel.

4,502,164

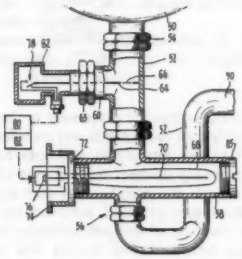
DEVICE FOR DESTROYING BACTERIAL FLORA

Leslie W. Gemmell, 72 Silverdale Rd., Eaglemont, Victoria, Australia

Continuation of Ser. No. 211,754, Dec. 1, 1980, abandoned. This application Jun. 27, 1983, Ser. No. 508,983

Int. Cl.³ A61L 2/04; E03C 1/126

U.S. Cl. 4—191 **18 Claims**



1. A device for destroying bacterial flora by sterilization of contaminated waste which contains the bacterial flora within a drainage pipe associated with a waste trap, said device comprising a housing, said housing has an inlet to allow waste material to pass from said drainage pipe into said housing, heating means in said housing for heating the waste material such that any bacterial flora which gathers in or on said housing may be sterilized by heat from said heating means, a liquid temperature sensor for sensing the temperature of liquid within the housing, a housing temperature sensor for sensing the temperature of the housing, a probe mounted in the housing for sensing the level of liquid within the housing so as to change states if the level falls below a predetermined level, and temperature controlling means electrically connected to the liquid temperature sensor, the housing temperature sensor, the probe and the heating means, said temperature controlling means energizing the heating means for a predetermined time period if the sensed liquid temperature is below a first predetermined temperature value and if the liquid level is above its predetermined level; provided that, the housing temperature remains less than a second predetermined temperature value and the liquid level remains above its predetermined level; whereby the device safely destroys bacterial flora associated with contaminated device.

4,502,165

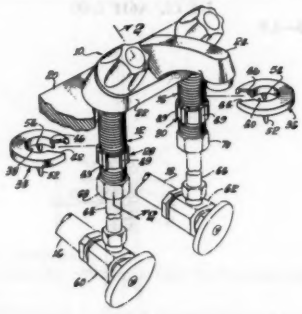
WASHER AND NUT COMBINATION FOR LOCKING PLUMBING FIXTURES TO A SINK DECK OR THE LIKE

Robert S. Szemeredi, Tujunga; Matthew G. Tarnay, Pasadena, and Kenneth Lee, Los Angeles, all of Calif., assignors to Price Pfister, Inc., Pacoima, Calif.

Filed May 11, 1983, Ser. No. 493,648

Int. Cl.³ E03C 1/04

U.S. Cl. 4—192 **8 Claims**



1. In a plumbing installation including a plumbing fixture having an externally threaded shank and a mounting structure having a hole through which the shank extends, THE COMBINATION THEREWITH OF

a nut part and a washer part forming a separable unit for securing said plumbing fixture at said mounting structure, said nut part being threadedly mounted on said shank and sized to pass through said hole while in place on said shank, said washer part having an opening intercepted by a lateral access slot for lateral placement of the washer part on the shank between the nut part and the mounting structure while the nut part is to the distal end of the shank relative to said mounting structure, said nut and washer parts having means forming an axially separable connection therebetween so that, when connected, rotation of either the nut part or the washer part rotates both, one of said parts having outwardly extending projections to facilitate rotation said washer part being clamped against said mounting structure to secure said plumbing fixture thereto when said nut and washer parts are axially positioned in one direction along said shank to the limit allowed by said washer part.

4,502,166

TWO PIECE CLOSET RING

Theodore C. Brown, Sr., 601 Beaver Dam Rd., Raleigh, N.C. 27607

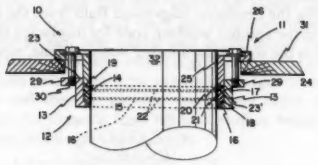
Filed May 21, 1982, Ser. No. 380,554

Int. Cl.³ E03C 1/00

U.S. Cl. 4—252 R **7 Claims**

1. An improved closet ring for use in conjunction with a pipe type means comprising: a first section including a ring-like portion having a generally flat lower surface; a second section including a ring-like portion so sized as to telescopically receive at least a portion of said ring-like portion of said first section, said ring-like portion of said second section including a beveled, flat-in-cross-section, interiorly projecting shoulder coming to a point at its lower extremity; said pipe type means disposed adjacent to and interiorly of said telescoped first and second sections; a gasket means formed from a neoprene type resilient material and having a generally flat upper surface with a groove-like depression formed therein, said upper surface of

said gasket being disposed generally juxtaposed to said flat lower surface of said first section, said gasket having at least two inwardly projecting sealing ribs lying juxtaposed to a portion of said pipe type means, has an exterior lying juxtaposed to at least a portion of the interior of said ring portion of said second section, and has a lower, flat-in-cross-section,



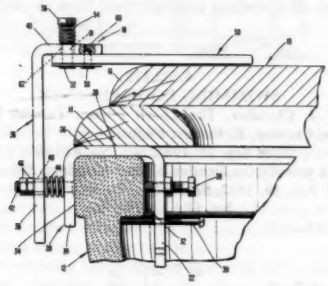
beveled portion coming to a point at its lower extremity lying juxtaposed to said flat beveled shoulder of said second section; and means for creating telescopic pressure between said first and said second sections whereby said gasket will be forced by said flat surface and said beveled shoulder into sealing contact with said pipe disposed interiorly of said section.

4,502,167

APPARATUS FOR SECURING A TOILET BOWL LID CLOSED

Christian S. Porzelius, R. #1, El Paso, Ill. 61738

Filed Nov. 15, 1983, Ser. No. 551,832
Int. Cl.³ A47K *13/24*
U.S. Cl. 4—253 **11 Claims**



1. A lock for a toilet lid, comprising:

a mounting bracket adapted to be secured to a toilet bowl such that a section of the bracket is disposed outside of the bowl,

a post mounted at one end to said section of said bracket so as to be swingable to a retracted position in a direction away from the toilet bowl against a first spring bias,

a locking arm mounted to the other end of said post so as to be movable relative to said post into a position overlying the toilet lid with the post in an upright orientation, in order to prevent the lid from being opened,

said locking arm carrying first securing means which is engageable with second securing means on said post to secure said locking arm in overlying relationship with the toilet lid,

said first and second securing means being arranged to be mutually disengageable only with said post in said retracted position,

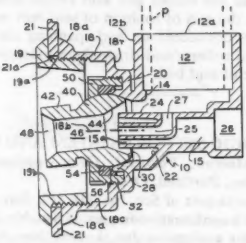
said locking arm being movable out of said overlying relationship when said first and second securing means are mutually disengaged in order to enable the toilet lid to be opened.

4,502,168

HYDROTHERAPY JET FOR TUBS, SPAS OR POOLS

William R. Jaworski, Minneapolis, Minn., assignor to Jope Manufacturing Co., Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 427,847, Sep. 29, 1982, Pat. No. 4,422,191. This application Oct. 12, 1983, Ser. No. 541,094
The portion of the term of this patent subsequent to Dec. 27, 2000, has been disclaimed.
Int. Cl.³ A04H *3/18*; A61H *33/02*; E03C *1/02*
U.S. Cl. 4—496 **7 Claims**



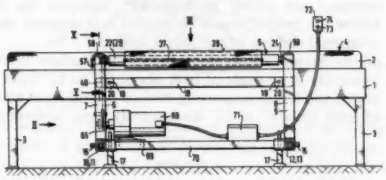
1. A hydrotherapy jet comprising a housing including a nozzle containment chamber having a nozzle mounted movably therein, said chamber having a cylindrical side wall adapted to be mounted for rotation within a round hole in the wall of a tub, pool or spa, a water inlet duct at right angles to the axis of the chamber, and an air inlet duct having a mouth aligned with said axis of said chamber whereby the jet housing can be rotated in the hole to point the water inlet duct in any direction extending radially from said axis without changing the position of the mouth of the air inlet whereby water and air inlet positions are independent of one another so that plumbing for water is facilitated by enabling water supply pipes extending parallel to said tub wall to be connected to the water duct and to extend in any direction in a plane parallel to said tub wall without also changing the position of air pipes used for supplying air to the air inlet.

4,502,169

APPARATUS FOR TURNING A PERSON CONFINED TO BED

Torsten Persson, Havstenssund 7583, S-450 81 Grebbestad, Sweden

Filed Jul. 23, 1982, Ser. No. 401,354
Claims priority, application Sweden, Jul. 27, 1981, 8104546
Int. Cl.³ A61G *7/10*
U.S. Cl. 5—88 **11 Claims**



1. Apparatus for turning a person confined to bed, comprising

a substantially U-shaped support means surrounding the bed in the middle and from below, said support means including vertically disposed posts extending up to mattress level;

a pair of rollers disposed along, and parallel to, each long side of said bed, each roller being supported, by a pair of said posts, for rotation about its axis of rotation;

each end of said rollers concentrically carrying bolt means,

and each of said posts carrying bearing means for rotatably supporting said bolt means;

means for rotatably driving one of said rollers;

means, carried by at least one of said posts, for moving said bolt means and said driving means relative to one another between a first position wherein said bolt means and said driving means are engaged and a second position werein said bolt means and said driving means are disengaged, said moving means comprising pin means carried by said driving means and recess means carried by said bolt means, said pin means and said recess means extending normal to the axis of rotation of said bolt means; and

a draw sheet connected to, and spanning the distance between, said rollers, said draw sheet extending across the upper side of said bed.

4,502,170

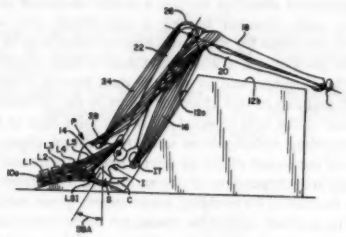
PHYSIOLOGIC SUPPORT SYSTEM AND METHOD

Winston G. Morrow, Portland, Oreg.,· assignor to Spinal Dynamics, Inc., Portland, Oreg.

Continuation-in-part of Ser. No. 210,212, Nov. 25, 1980, abandoned, and a continuation-in-part of Ser. No. 218,719, Dec. 22, 1980,. This application Jun. 1, 1982, Ser. No. 384,107

Int. Cl.³ A47G 9/00

U.S. Cl. 5—431 **1 Claim**



1. A system for improving the posture and relieving lower back pain of a person in a supine position comprising:

a substantially convex back pillow including means for supporting the ilia, sacrum, and fifth lumbar vertebra to produce a substantial sacral base angle and to fully oppose any moment to cause rotational shifting of the pelvis,

said back pillow being a crescent-shaped, resilient member comprising an upper portion and a lower portion, the lower portion being formed of a resilient material having a greater density than the material forming the upper portion so that, when the pillow is positioned behind the user's back with the lower portion aligned with the user's sacrum, said pillow preferentially supports the pelvis below the lumbar region to oppose said moment causing rotational shifting of the pelvis; and

a pillow having a first, thigh-supporting surface extending upwardly at an angle of from about 53° to 63° from horizontal and a calf-supporting surface extending at an angle of from about 0° to 20° downwardly from horizontal.

4,502,171

PROCEDURE FOR WASHING CELLULOSE

Ensio Koskinen, and Erkki Yli-Vakkuri, both of Savonlinna, Finland, assignors to Enso-Gutzeit Oy, Helsinki, Finland

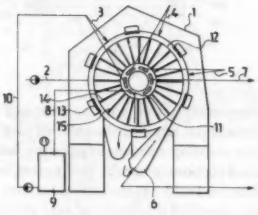
Filed Aug. 4, 1983, Ser. No. 520,168

Claims priority, application Finland, Aug. 6, 1982, 822736

Int. Cl.³ D21C 9/06

U.S. Cl. 8—156 **4 Claims**

1. Improvement in a procedure for washing cellulose on a drum comprising the steps of conducting a continuous pulp web along a path of travel through a plurality of mutually separated washing zones located one after the other on the drum with the pulp web containing fluid as it moves through the washing zones, introducing pure washing liquid into the last washing zone in the path of travel of the pulp web on the drum, displacing the suspension fluid contained in the web in the last washing zone by the introduction of the pure washing liquid, providing a drained fluid pipe system on the drum and using the drained fluid pipe system for directing the displaced suspension fluid from the last washing zone to another washing zone upstream in the path of travel from the last washing zone, introducing the displaced suspension fluid from the last washing zone in the another washing zone for displacing the suspension fluid in the web in the another washing zone, repeating the



introducing and displacing steps each time into an upstream washing zone from the washing zone where the displacing step is performed until the displaced suspension fluid has been introduced into each washing zone upstream from the last washing zone, wherein the improvement comprises before discharging the pulp web from the drum after the pulp web has traversed the last washing zone, emptying part of the fluid from the drained fluid pipe system at a location downstream from the last washing zone and returning the drained fluid therefrom to a washing zone upstream from the last washing zone.

4,502,172

SWIMMING POOL CLEANER

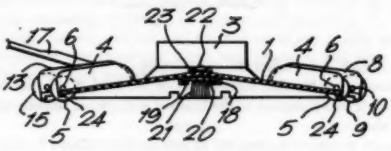
Michael J. Chandler, The Coach House, Turners Hill Rd., Worth, Crawley, E. Sussex, England

Filed Sep. 23, 1982, Ser. No. 422,290

Claims priority, application United Kingdom, Sep. 28, 1981, 8129187; Jun. 18, 1982, 8217666

Int. Cl.³ E04H 3/20

U.S. Cl. 15—1.7 **9 Claims**



1. A vacuum cleaner head suitable for use in the cleaning of the interior surfaces of a pool comprising a sheet of flexible material, said sheet having an upper side which is intended to face away from the pool surface to be cleaned and an opposite lower side, said sheet further having front and trailing edges and a pair of substantially parallel side edges, a centrally located aperture in said sheet, means for coupling a source of suction pressure to the head, said coupling means circumscribing said aperture and being located on the said upper side of said sheet, means for spacing the front and trailing edges of said sheet from the interior surfaces of the pool when in use, said spacing means including a plurality of support means on said upper side of said sheet adjacent the periphery of said front and trailing edges, said spacing means each further including a wheel mounted from each of said support means and extending

partly below the lower side of said sheet, means for attaching a handle to the upper side of said sheet whereby motion may be imparted to the head to cause the head to move over the interior surface of a pool being cleaned, the material characteristics of said sheet and the positioning of said support means being selected whereby said sheet may simultaneously flex relative to a first axis transverse to said side edges and a second axis transverse to said first axis, and brush means supported from said lower side of said sheet and extending transversely with respect to said side edges, said brush means extending below said sheet a distance which is greater than the extension of said wheels below said front and trailing edges whereby the bottom of said sheet in the vacinity of said brush means is spaced a greater distance from the pool surface being cleaned than are said front and trailing edges.

4,502,173

FLOOR-SWEEPING MACHINE

Dieter Pätzold, Nassau; Alfons Schreiber, Wuppertal, and Peter Tiwi, Nassau, all of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

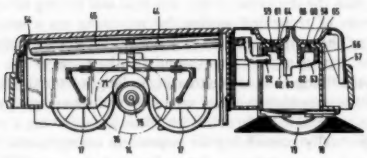
PCT No. PCT/DE82/00004, § 371 Date Sep. 8, 1982, § 102(e) Date Sep. 8, 1982, PCT Pub. No. WO82/02330, PCT Pub. Date Jul. 22, 1982

PCT Filed Jan. 7, 1982, Ser. No. 422,979

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1981, 3100497

Int. Cl.³ A47L *11/33*

U.S. Cl. 15—41 R **13 Claims**



1. In a floor-sweeping machine of the type including a housing having a top portion, a cylindrical brush rotatably mounted in the housing and drive wheels engaging the brush for rotation thereof, the combination comprising:

adjusting means pivotally mounted in the housing for varying the height of the housing relative to the wheels, said adjusting means having two legs;

a casing rotatably supporting at least some of the wheels;

means for clamping said casing to one of said legs of said adjusting means, said clamping means having oppositely directed projections for guiding the movement of the casing in the housing;

means for urging said adjusting means in a direction towards the top portion of the housing; and

wedge means engaging said adjusting means for moving said adjusting means oppositely to said direction.

4,502,174

POLISHING PAD

James M. Rones, Atlanta, Ga., assignor to Land Industries, Acworth, Ga.

Filed Dec. 23, 1982, Ser. No. 452,553

Int. Cl.³ B24B *29/00*; A47L *11/14*

U.S. Cl. 15—98 **4 Claims**

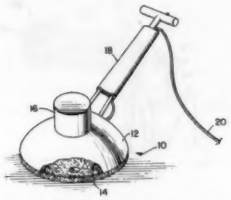
1. In combination with a floor polishing machine having an electric motor, a handle and a polishing pad support, the improvement comprising:

a polishing pad of fibrous material having a central aperture for receiving means on the machine for attaching the pad to a polishing pad support;

a plurality of apertures in the surface of the pad near the periphery thereof and remote from the central aperture; said plurality of apertures being eccentric about and remote from the central aperture;

a first floor contact area between the central aperture the plurality of apertures;

a second floor contact area between said plurality of apertures;



a third contact area between the plurality of apertures and the periphery of the pad; and

said plurality of apertures for receiving the surface area of the pad thereby reducing the drag on the machine whereby the amount of current drawn drops from 16 amps to 12 amps whereby over-heating and blown fuses are substantially eliminated.

4,502,175

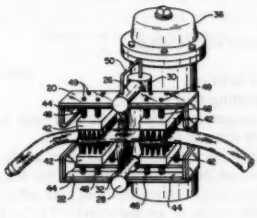
PORTABLE FIRE HOSE CLEANING APPARATUS

William J. Hillis, Box 2986 - St. Rte. 13, New Lexington, Ohio 43764

Filed Feb. 28, 1983, Ser. No. 470,607

Int. Cl.³ D06G *1/00*; B08B *1/02*

U.S. Cl. 15—104.92 **2 Claims**



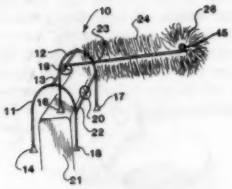
1. A portable fire hose cleaning apparatus comprising in combination, a frame means supporting at least two sets of horizontally spaced fixed brush means, each of said sets including a pair of opposed brush means having the ends of their respective bristle portions disposed in vertical alignment and closely adjacent to the ends of the bristle portions in other of said pair, a vertically disposed supply conduit member provided with a horizontally disposed inlet pipe means for connection to a conventional fire hydrant and with a pair of outlets, each communicating with one of a pair of vertically spaced, horizontally extending tubular members, each of said tubular members being connected to said frame means between said sets of brush means, and provided with nozzle means having outlets directed in opposing directions to provide a water spray directed vertically between said sets of brushes.

4,502,176

BOTTLE BRUSH/GLASS CLEANER

Mark E. Wallace, 1625 First St., Anderson, Calif. 96007

Filed Jan. 24, 1983, Ser. No. 439,913
Int. Cl.³ A46B *15/00, 11/06*
U.S. Cl. 15—164 **4 Claims**



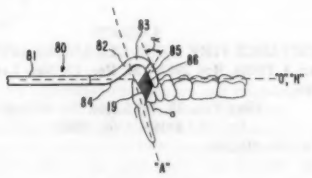
1. An apparatus for cleaning bottles, glasses or other items, comprising:
a base constructed of two or more rods formed to fit over the center section of a double sink or similar structure and attached to each other by at least one rod;
securing means attached to said base whereby said base securely attaches to a surface, and
a brush mounted on a structural center piece rigidly attached to and extending outward from said base.

4,502,177

TOOTHBRUSH

Russell J. Beggs, 211 Stockton Ave., #2, Capitola, Calif. 95010

Filed Mar. 2, 1983, Ser. No. 471,560
Int. Cl.³ A46B *9/04*
U.S. Cl. 15—167 R **1 Claim**



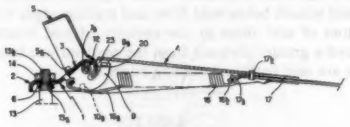
1. A toothbrush comprising:
a handle;
a plurality of bristles;
a head for holding said bristles;
a neck for connecting said handle and said head with an offset angle formed therebetween,
wherein said neck causes said offset angle to approximately equal the average value of the long axis of the anterior teeth of the population, said offset angle being within the range of approximately 110°–122° such that when said toothbrush is used to clean the lingual aspects of the anterior teeth said head is approximately parallel to the long axis of the anterior teeth, and said handle is approximately parallel to the occlusal plane,
wherein said neck further provides a reverse angle, said reverse angle in the neck providing an angle between the neck and the handle within the range of approximately 120°–170°, wherein when said toothbrush is used to clean the lingual aspects of the anterior teeth, said handle is approximately parallel to said occulsal plane and lies closer to said occlusal plane than would be the case if said reverse angle were not used, and
wherein said bristles exit said head at an exit angle of approximately 45° measured between the length of said bristles and that portion of said head furthest from said neck, said bristles being substantially parallel with teach other and the same length.

4,502,178

STAMPED CONNECTOR FITTINGS FOR WINDSCREEN WIPER ARMS

Roger A. Ragot, Orly, and Claude J. Wolf, Chantilly, both of France, assignors to Equipements Automobiles Marchal, Issy-les-Moulineaux, France

Filed Mar. 28, 1983, Ser. No. 479,359
Claims priority, application France, Apr. 2, 1982, 82 05768
Int. Cl.³ B60S *1/40*
U.S. Cl. 15—250.34 **15 Claims**



1. A stamped metal connector fitting for a windscreen wiper arm for mounting the arm on an output spindle of a windscreen wiper drive mechanism, said connector fitting being stamped from a metal sheet and including a fixing zone for securing the connector to the output spindle, and an articulation zone for pivotally connecting a wiper arm casing to the fitting itself, said connector fitting comprising, a U-shaped body having side walls and a top wall, and said side walls in the fixing zone extending only partly around the spindle and being open in a direction toward the articulation zone, said top wall in the fixing zone have formed therein an integral collar of a height greater than the thickness of said top wall and having an opening therein of truncated section for mounting on a serrated portion of the output spindle, said side walls, in said articulation zone having a thickness essentially the same as the side walls in the fixing zone and increasing in height from the fixing zone to the articulation zone, said side walls having aligned openings therein, in the articulation zone, for receiving a pivot pin for pivotally connecting the wiper arm casing to the connector, and means between the collar and the openings for receiving the pivot pin for pivoting the wiper arm casing, for connecting an end of a spring to the connector for forcing the wiper arm toward a windshield.

4,502,179

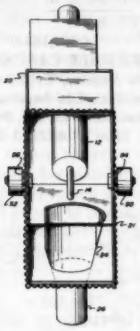
APPARATUS FOR COLLECTING PROCESS GENERATED FUME AND/OR SLAG

William J. Coughlin, Lancaster; Perry J. Rieppel, Worthington, and Stephen A. Hoffman, Lancaster, all of Ohio, assignors to Arcair Company, Lancaster, Ohio

Division of Ser. No. 269,183, Jun. 1, 1981, Pat. No. 4,426,566, which is a continuation-in-part of Ser. No. 25,230, Mar. 30, 1979, abandoned. This application Sep. 22, 1983, Ser. No. 534,532
Int. Cl.³ A47L *5/14*
U.S. Cl. 15—322 **2 Claims**

2. A collection nozzle for receiving a stream of fume and/or waste particulate matter directed at said nozzle by a process apparatus comprising in combination:
a hollow, generally elongated outer housing having a first end adapted for positioning toward said stream of fume and/or slag and a second end adapted for connection to a device for evacuating said nozzle;
an inner complimentary shaped housing fixed to said outer housing to define a water jacket for cooling said nozzle, said inner housing containing a plurality of angularly disposed apertures around its inner periphery to direct a plurality of streams of fluid toward said second end, said streams converging at a point along the longitudinal axis

defined by the center line of said second end of said nozzle; and



a conduit to admit water and air to said jacketed assembly said conduit adapted for connection to a source of water and air.

4,502,180

DOOR CONTROL DEVICE HAVING PISTON ASSEMBLY WITH SEPARATELY FORMED RACK

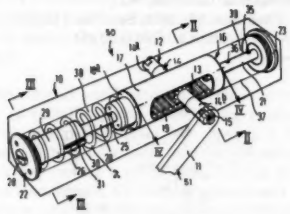
Stephen J. Harrison, and Peter E. Brown, both of Bridgenorth, England, assignors to Jebron Limited, Bridgenorth, England

Filed Nov. 26, 1982, Ser. No. 444,528

Claims priority, application United Kingdom, Nov. 28, 1981, 8135981

Int. Cl.³ E05F *3/10*

U.S. Cl. 16—52 **5 Claims**



1. A door control device comprising a housing, defining an axis and a piston assembly which is slidable in the housing along the axis, wherein the piston assembly comprises a tubular wall portion having opposite ends, a pair of separate end plugs received in and attached to the wall portion adjacent to respective ones of said ends thereof, and a rack formed separately from the tubular wall portion and the plugs and disposed inside the wall portion with teeth of the rack extending transversely of and equidistant from said axis, wherein opposite ends of the rack abut respective said end plugs, wherein one of the end plugs has formations which engage the rack and wherein said formations overlap with the rack along said axis to restrain movement of the rack about said axis, a pressure relief valve comprising a spring acting and secured between the rack and the valve, wherein the valve is located adjacent the abutment of the rack and the end plug.

4,502,181

MOUNT FOR AUTOMOTIVE LOOP STRAP THAT PIVOTS ON HORIZONTAL AXIS

Albert J. Gonas, Grosse Pointe, Mich., assignor to Voplex Corporation, Pittsford, N.Y.

Filed Aug. 17, 1983, Ser. No. 523,934

Int. Cl.³ E05B *7/00*

U.S. Cl. 16—126 **7 Claims**

1. A mount for a loop strap that pivots on a horizontal axis between vertical and horizontal positions, said mount comprising:

a. a fixed pivot pin arranged on said horizontal axis for supporting said loop strap;

b. a metal sleeve formed to wrap loosely around said pivot pin for pivoting said strap on said pin;

c. means for securing ends of said strap to said sleeve;

d. a cover arranged over said sleeve and said strap ends to pivot with and conceal said sleeve and said strap ends;

e. a pair of supports pressed onto opposite ends of said pivot pin and arranged to overlap, wherein each of said supports has a socket to receive an end of said pin; and

f. means for securing overlapping regions of said supports to a vehicle so that said strap and said cover hang downward to conceal said securing means.

4,502,182

OVER-CENTER HINGE

Karl Lautenschläger, Reinheim, and Gerhard Lautenschläger, Brensbach-Wersau, both of Fed. Rep. of Germany, assignors to Karl Lautenschläger KG, Möbelbeschlagfabrik, Reinheim, Fed. Rep. of Germany

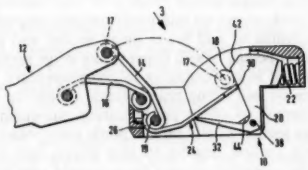
Filed Sep. 10, 1982, Ser. No. 416,549

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1981, 3136437; Jan. 20, 1982, 3201570; May 15, 1982, 3218435

The portion of the term of this patent subsequent to Dec. 27, 2000, has been disclaimed.

Int. Cl.³ E05F *1/12*

U.S. Cl. 16—288 **20 Claims**



1. Over-center hinge for cabinet doors, having a jamb-related part which can be fastened to a door jamb of a cabinet, and a door-related part in the form of a recess-mounting cup to be fastened in a door of a cabinet, and a linkage mechanism joining said cup to the jamb-related part and having a linkage end and being movable from a closed position to an open position through a dead-center position and vice versa, a cam mounted in said cup for pivoting by a given angular amount about a pivot axis, a compression spring biasing said cam toward the cup interior, a contact surface provided in the area of the linkage end of the jamb-related hinge part and sliding on

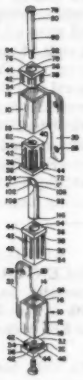
a profile surface of said cam which extends slantingly from a bottom area of the cup into the interior of the cup, during a portion of the movement between the closed position and the dead-center position, and forces the door to said closed position, a stop element in the form of a swivel arm fulcrumed within the cup in the area opposite the pivot axis of the cam and having a free end pointing toward the cam, said swivel arm terminating in a stop edge disposed parallel to the pivot axis and swingable upwardly in the interior of the cup, from a position in which the stop edge is below said profile surface to a position in which the stop edge holds the cam precisely in said dead-center position, in the interior of the cup there being provided a resilient element engaging said swivel arm under bias, said element urging said swivel arm into the position locking the cam in the dead-center position.

4,502,183

CAM OPERATED DOOR HINGE

Frank M. Clancy, Jr., Hudson, Ohio, assignor to The Sanymetal Products Co., Inc., Cleveland, Ohio

Filed Jan. 24, 1983, Ser. No. 460,182
Int. Cl.³ E05F *1/04*
U.S. Cl. 16—318 **5 Claims**



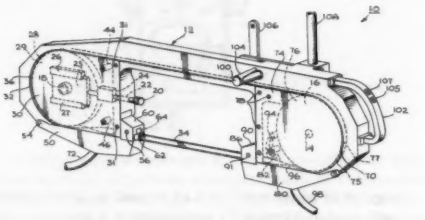
1. In a cam hinge device having a lower stationary hinge section and an upper riding hinge section, each having a cylindrical axial opening extending therethrough, a hinge pintle extending along a hinge axis through said openings supporting and axially aligning said hinge sections for pivotal movement of said riding hinge section relative to said stationary hinge section, a pintle sleeve on said pintle partially disposed within the axial opening of said lower hinge section and projecting into the axial opening of said upper riding hinge section, a cam surface on said sleeve engaging in complementary fashion a cam surface on said riding hinge section within the said axial opening thereof to effect reciprocating movement of said riding hinge section axially on said pintle upon rotation of said riding hinge section relative to said sleeve, and means for adjusting the camming contact between said cam surfaces to selective rotative positions relative to said lower hinge section, the improvement comprising each of said hinge sections having an identically-formed, seamless, sleeve-like outer metal casing with a uniform cross-section defining a uniform passage along the length thereof, and with a metal mounting leaf laterally extending therefrom, the casing of said stationary hinge section enclosing within said passage a first plastic block assembly having said axial opening and said means for selective adjustment integrally formed therein, and the casing of said riding hinge section enclosing a second plastic block assembly having said axial opening and said cam surface integrally formed therein, said block assemblies arranged within said casings such that said casing and leaf of said riding section are mounted in an axial position 180° opposite said stationary hinge section when said hinge is assembled.

4,502,184

REVERSIBLE CARCASS SAW

Ralph Karubian, Los Angeles, Calif., assignor to Kentmaster Manufacturing Co., Inc., Los Angeles, Calif.

Filed Jun. 30, 1983, Ser. No. 509,407
Int. Cl.³ A22B *5/20*
U.S. Cl. 17—23 **11 Claims**



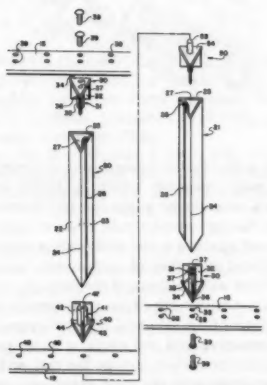
1. An improved carcass saw, including:
a frame;
first and second rims spaced from each other and each rotatably supported from said frame;
a common saw blade carried by both of said rims;
adjusting means for adjusting the spring between said rims for tensioning said common saw blade;
motor means coupled to one of said rims for causing such rim to rotate in a first direction, whereby said saw blade is caused to move in a first direction; and,
reversing means coupled to said motor means for reversing the direction of rotation of said motor means, whereby said saw blade is caused to move in the opposite direction.

4,502,185

SCREEN FOR CARDING MACHINES

Robert B. Jenkins, Jr., Gastonia, N.C., assignor to Jenkins Metal Corporation, Gastonia, N.C.

Filed Jun. 15, 1981, Ser. No. 273,970
Int. Cl.³ D01G *15/34*
U.S. Cl. 19—95 **3 Claims**



1. In a card screen having longitudinally extending side ribs and a center rib and transversely extending end and grid bars, the combination of each side rib having a plurality of openings extending therethrough and arranged in predetermined longitudinally spaced relation to each other, the center rib having a

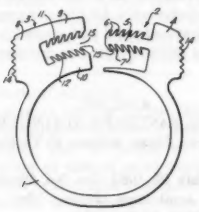
plurality of groups of openings extending therethrough and said groups being arranged in predetermined longitudinally spaced relation to each other, a first group of bars on one side of the center rib extending between one side rib and the center rib, a group of pins extending from each bar in the first group toward the center rib, a second group of bars extending between the other side frame and the center rib and each bar in the second group of bars having a group of sockets in it's end adjacent the center rib registrable with a selected group of openings in the center rib and receptive of the group of pins extending from an opposing bar in the first group of bars, each side rib having longitudinally spaced groups of openings effectively aligned with the groups of openings in the center rib, and fastening means penetrating the openings in the side ribs for connecting the bars to the side ribs.

4,502,186

CLIP FOR SECURING HOSEPIPES AND LIKE USES

Herbert E. Clarke, Swanage, and Peter R. Lampkin, Godstone, both of England, assignors to Blounthurst Limited, Kidlington, England

Filed Oct. 20, 1981, Ser. No. 313,115
Int. Cl.³ F16L *33/00*
U.S. Cl. 24—16 PB **2 Claims**



1. A releasable hose clip for tightly clamping an article such as a hose pipe, said clip comprising

(1) a band for encircling the article, and

(2) a pair of interlocking elements at the respective ends of the band, said elements being interengageable with each other to secure the clip tightly around the article being clamped,

wherein:

(a) a first of said interlocking elements is constituted by a pair of radially-spaced jaws having a space therebetween, the radially-inner jaw having a set of teeth formed on a radially-outer face thereof and the radially-outer jaw having a set of teeth formed on a radially-inner face thereof, the teeth of each of said sets extending in an axial direction and having backwardly-sloping rear surfaces,

(b) the other of said interlocking elements of the pair is constituted by a single-piece tongue having a set of teeth formed on each of a radially-inner face and a radially-outer face thereof, the teeth of each of said sets extending in an axial direction and having backwardly-sloping rear surfaces, said set of teeth on said tongue being capable of interengaging with said set of teeth on said jaws to secure the clip around said article,

(c) said jaws define an open jaw mouth through which said tongue can be inserted in its longitudinal direction, tip first into the jaws to interengage said sets of teeth,

and

(d) the space between said jaws is open at the opposed axially spaced sides thereof to permit said tongue when engaged in the jaws to be moved axially relative to the jaws to disengage the tongue from the jaws,

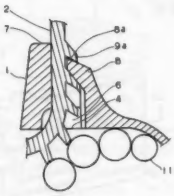
(e) the jaws are connected together by a resilient bridging member.

4,502,187

BANDS FOR CLAMPING

Hiroji Kitagawa, Nagoya, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan

PCT No. PCT/JP81/00108, § 371 Date Jan. 5, 1983, § 102(e) Date Jan. 5, 1983, PCT Pub. No. WO82/04030, PCT Pub. Date Nov. 25, 1982
PCT Filed May 11, 1981, Ser. No. 457,073
Int. Cl.³ B65D *63/00*
U.S. Cl. 24—16 PB **15 Claims**



1. A clamping band for use in the form of loop, said clamping band comprising:

(a) an elongated, flexible, strap-like tongue having uniform width and thickness over its length;

(b) engaging teeth provided on the surface of one side of said tongue and having engaging surfaces on one side thereof and trailing surfaces on the other side thereof, said engaging surfaces and said trailing surfaces both extending in the transverse direction of said tongue;

(c) a joint portion formed integrally at one end of said tongue, said joint portion being approximately half as thick and twice as wide as said tongue;

(d) a plurality of holding protrusions on the opposite side of said tongue from said engaging teeth near the end of said tongue remote from said joint portion;

(e) a head formed integrally at the end of said joint portion remote from said tongue, said head having an entrance surface coplanar with one surface of said joint portion and an exit surface remote from said entrance surface;

(f) said head having a generally conical shape extending perpendicularly from said entrance surface in the opposite direction from said engaging teeth and having a rigid, thick structure;

(g) said head having an insertion hole extending therethrough from its entrance surface to its exit surface, said insertion hole being sized to receive said tongue and said engaging teeth;

(h) the angle between the engaging surfaces of said engaging teeth and the surface of said tongue being a first acute angle;

(i) a small, flexible lip portion formed integrally on said head on the internal surface of said insertion hole in position to fit between two adjacent ones of said engaging teeth and to bear against the engaging surface of one of said two adjacent ones of said engaging teeth and the trailing surface of the other of said two adjacent ones of said engaging teeth, said small lip having opposing surfaces which are angled towards each other in the direction from the base to the top of said small lip by a third acute angle at least approximately equal to the difference between said first and second acute angles, whereby said small lip makes at least approximately planar engagement with the engaging surface of one of said two adjacent ones of said engaging teeth and the trailing surface of the other of said two adjacent ones of said engaging teeth; and

(j) said small lip, said insertion hole, said tongue, and said engaging teeth being sized such that if, after said small lip has become engaged between two adjacent ones of said engaging teeth, an attempt is made to pull said tongue out of said insertion hole in the reverse direction, said lip will flex inwardly in said insertion hole, jamming the opposite side of said tongue from said engaging teeth against the

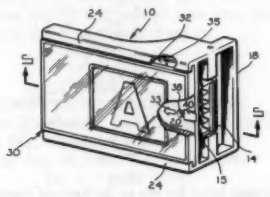
opposite side of said insertion hole from said small lip, preventing withdrawal of said tongue from said insertion hole.

4,502,188

THEME BELT BUCKLE

Jerry L. Kohli, Feeding Hills, Mass., assignor to Buxton, Inc., Agawam, Mass.

Filed Apr. 5, 1983, Ser. No. 482,216
Int. Cl.³ A44B *11/22*
U.S. Cl. 24—163 K **2 Claims**



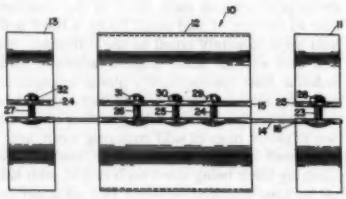
1. Belt buckle for selective display of decorative inserts having a pivotable latch-lever for releasably fastening an inner end portion of a belt to said buckle and means disposed on the underside of said buckle for engaging an outer end portion of said belt to fasten the same in looped configuration about a person's waist, said buckle comprising a rectangular, recessed base portion having opposed, inwardly opening channels disposed along the side edges of the base, said base portion having a planar outer surface with outwardly opening inner and outer ends, a socket provided adjacent the inner end of said base and an inclined ramp extending from the edge of said socket to the outer end of said base, each of said inserts comprising a rectangular panel having an outer decorative surface and an inner surface, said panel having inner and outer end portions and side edge portions of reduced thickness which are dimensioned for sliding fit within the edge channels of the buckle, a post member disposed on the underside of said panel adjacent its outer end for inter-engagement with the socket when the panel is fitted within the side channels of said buckle in end-to-end relation, the panel from the upper surfaces of its side edges to the lower suface of said post being approximately equal in dimension to the distance from the undersurface of said edge channels to the upper surface of said base whereby the post is adapted for a snap fit with said socket.

4,502,189

COUPLING WITH OUTRIGGER PARTS

James Sieberkrob, Erie, and Leo Campbell, Union City, both of Pa., assignors to Morris Coupling Company, Erie, Pa.

Filed Jun. 21, 1982, Ser. No. 390,264
Int. Cl.³ F16L *21/06, 55/16*
U.S. Cl. 24—279 **3 Claims**



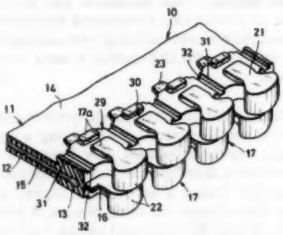
1. A coupling comprising a first clamp body,
a second clamp body,
said clamp bodies being made of a first flat piece of material and a second flat piece of material,
said flat pieces of material each having a first end and a second end and being curved into a general cylindrical shape,
first pockets formed on said first ends,
second pockets formed on said second ends,
an outrigger bar extending through said first pockets for holding said first clamp body and said second clamp body in spaced relation to each other,
a first bar means extending through said second pocket on said first clamp body,
said first bar means having a plurality of holes extending therethrough,
a second bar means extending through said second pocket on said second clamp body,
said second bar means having a plurality of holes extending therethrough, holes in said outrigger bar, holes in said pockets,
and first bolts extending through said holes in said outrigger bar and said first pocket of said first clamp body and through said holes in said first bar means and said second pocket of said first clamp body, for clamping said first clamp body,
second bolts extending through said holes in said first pocket of said second body, and said outrigger bar and through said holes in said second bar means and said second pocket of said second clamp body, for clamping said second body whereby said first body and said second body are held in spaced clamped relation from one another.

4,502,190

SLIDE FASTENER STRINGER

Akio Inamura, Nyuzen, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed May 19, 1983, Ser. No. 496,074
Claims priority, application Japan, May 19, 1982, 57-73379[U]; May 19, 1982, 57-73380[U]
Int. Cl.³ A44B *19/00*
U.S. Cl. 24—389 **5 Claims**

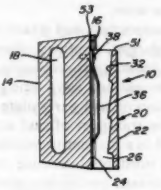


1. A slide fastener stringer comprising:
(a) an elongated stringer tape having first resilient and water-resistant layers on both surfaces thereof;
(b) a row of coupling elements mounted on a longitudinal marginal edge of said stringer tape;
(c) a second resilient and water-resistant layer mounted on each surface of said stringer tape along said row of coupling elements and integral with one of said first resilient and water-resistant layers, said second resilient and water-resistant layer having portions covering said coupling elements in part and also having portions interconnecting adjacent ones of said coupling elements, said coupling-element-interconnecting portions having slots extending transversely of said stringer tape; and
(d) a resilient and water-resistant sealing fin projecting laterally from said longitudinal marginal edge of said stringer tape and lying in the plane of said tape.

4,502,191
STRAP BUCKLE

Garry Savage, Montreal, Canada, assignor to Institut de Recherche en Sante et en Securite du Travail du Quebec, Montreal, Canada

Filed Jun. 14, 1983, Ser. No. 504,301
Claims priority, application Canada, May 6, 1983, 427636
Int. Cl.[3] A44B 13/02, 19/00
U.S. Cl. 24—580 5 Claims



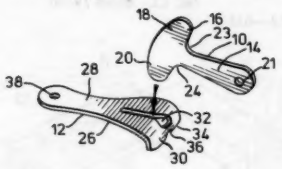
1. A strap buckle comprising:
(a) a male element including
(i) a strap engaging portion on one side thereof; and
(ii) a female-engaging part on the opposite side thereof, said female-engaging part including an elongated edge member having a top section and T-shaped lower section including a stem portion and a web portion, said web portion having an outer surface and two opposite inner surfaces; first locking means on each said inner surface;
(b) a female element including
(i) a strap engaging portion on one side thereof; and
(ii) a male-engaging part on the opposite side thereof, said male-engaging part including an elongated hollow housing being so shaped as to engagedly receive said edge member of said male element therein; said housing having an outer wall slotted to receive said stem portion and an inner wall facing the outer surface of said web portion when said male and female elements are engaged to one another; second locking means on the inner face of said slotted wall adapted to interfittingly engage said first locking means of said male element;
(iii) spring means on said inner wall of said housing adapted to forceably contact said web outer surface when said male and female elements are interengaged; said spring means maintaining said first and second locking means in interlocking engagement whereby disengagement of said female and male elements is effected through two movements: a first lateral movement pressing said web outer surface against said spring means to free said first and second locking means from one another, and a second movement, normal to said first movement, displacing longitudinally said edge member out of said housing while maintaining said web outer surface against spring means.

4,502,192
SEPARABLE FASTENER

Herman A. Hess, 10 Eddystone Ave., Downsview, Canada M3N 1H4

Filed Jul. 15, 1983, Ser. No. 513,825
Int. Cl.[3] A44B 19/00
U.S. Cl. 24—590 8 Claims

1. A separable fastener comprising:
a male member having a stem portion and a T-shaped head portion with two arms projecting sidewards from the stem portion,
and a female member constituted by an elongated body with a tail portion and a forward portion that is bent with respect to the tail portion, the elongated body having an opening therethrough adjacent the bent forward portion, the opening being of sufficient length to permit insertion of one arm of said T-shaped head portion of the male member, said bent forward portion of the female member terminating at an edge which interferes with complete passage of the T-shaped head portion through the opening in any but one particular orientation of the male member with respect to the female member, said edge having an

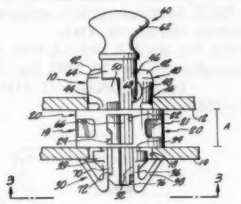


indentation adapted to receive the T-shaped head portion when in said one particular orientation in order to avoid interference and permit complete passage of the T-shaped head portion through the opening, the opening further having a part wide enough to permit swivelling of the stem portion after passage of the T-shaped head portion through the opening.

4,502,193
STAND-OFF FASTENER

Raymond E. Harmon, Tustin, and Lloyd R. Poe, Long Beach, both of Calif., assignors to Hartwell Corporation, Placentia, Calif.

Filed Dec. 14, 1981, Ser. No. 330,260
Int. Cl.[3] A44B 21/00
U.S. Cl. 24—621 8 Claims



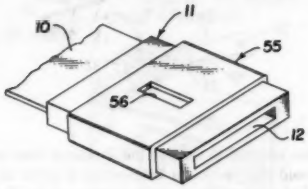
1. A fastener for joining a first member at a first aperture therethrough in a fixed relationship to a second member at a second aperture therethrough, comprising
a fastener body including a spacer, a first locking element on one side of said spacer, a second locking element on the other side of said spacer and a channel extending through said spacer, said first locking element and said second locking element, said first locking element having first movable tabs extending outwardly from said body at a distance from said spacer, said second locking element having second movable tabs defining a split body portion; and
a plunger slidably extending into said channel, said plunger extending from said second locking element and being no larger than said split body portion in cross section, said plunger and said channel including surfaces for moving said tabs outwardly with advancement of said plunger.

4,502,194

CHILD PROOF SEAT BELT

Roy E. Morris, Rte. 2, Box 149, Cedar Creek, Tex. 78612, and Cornelius E. Lynch, Jr., 13201 Wild Turkey Dr., Manchaca, Tex. 78652

Filed May 6, 1983, Ser. No. 492,167
Int. Cl.[3] A44B *19/00*
U.S. Cl. 24—633 13 Claims



1. For use with a seat belt which includes a latch housing and a coacting latch tongue fixed to respective seat belt segments; said latch tongue being insertable in said latch housing to fasten said seat belt, and said latch housing having an end opening to pass said latch tongue; said latch housing having a release button exposed to one face thereof, dimensioned to be depressed by a thumb or finger to release said latch tongue from said latch housing;

a safety cover enclosing said release button in said one housing face; said cover having a release aperture disposed to overlie only a small portion of said release button; said release aperture enabling depression of said release button only by an instrument dimensioned to pass through said release aperture;

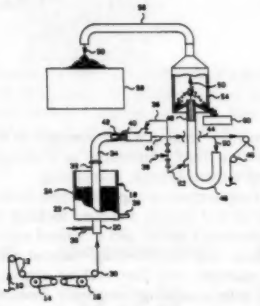
said safety cover comprising a band secured to one face of said housing.

4,502,195

METHOD FOR SEPARATING PARTICULATE MATERIALS FROM FIBROUS MATERIALS DURING START-UP OF TEXTURIZING PROCESS

Sanford N. Smith, Spartanburg, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 206,514, Nov. 13, 1980, Pat. No. 4,432,867.
This application Sep. 29, 1982, Ser. No. 427,407
Int. Cl.[3] D02G *1/12, 1/16*
U.S. Cl. 28—255 10 Claims



1. In a process for texturizing a multifilament strand of fibrous material, wherein; the strand is contacted with a high velocity fluid jet in a turbulent zone and at an elevated temperature, the strand is then passed through a body of dense, particulate material to produce an elongated wad, the wad is passed through a first elongated, confined zone while simultaneously passing a first fluid stream toward the inlet end of the first confined zone to retard break-up of the wad and cool the same and the wad is then broken up and the strand withdrawn from the first confined zone to a product collection zone; a method of starting up the process, during which start-up a portion of the particulate material becomes entrained in the wad and the strand, comprising:

(a) diverting the strand from its normal path from the first confined zone to the product collection zone by transporting said strand upwardly through a confined inlet zone by a second fluid stream;

(b) continuing transporting said strand upwardly through a substantially enlarged, confined, disengaging zone while simultaneously reducing the velocity of said second fluid stream by an amount and for a time sufficient to release a substantial portion of said particulate material but insufficient to stop the transport of said strand by said second fluid stream and in a manner to maintain said strand unencumbered for a substantial distance on all sides and maintain the thus released particulate material out of contact with said strand;

(c) collecting the thus released particulate material;

(d) transporting said strand upwardly through a confined outlet zone spaced from said confined inlet zone by the distance of said disengaging zone; and

(e) passing said strand to a waste collection zone;

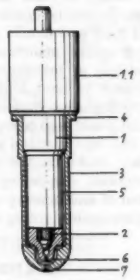
(f) said start-up being continued for a time sufficient to stabilize the texturizing process by the complete formation of the wad and the obtension of the desired degree of texturizing of the strand.

4,502,196

METHOD FOR MANUFACTURING AN INSULATED FUEL INJECTION NOZZLE DEVICE

Heinz Kupper, Am Driesch 6, 521 Troisdorf-Sieglar, and Helmut Busch, Steinacker 66, 5204 Lohmar 1, both of Fed. Rep. of Germany

Division of Ser. No. 230,673, Feb. 2, 1981, Pat. No. 4,434,940.
This application Aug. 29, 1983, Ser. No. 527,356
Claims priority, application Fed. Rep. of Germany, Feb. 5, 1980, 3004033
Int. Cl.[3] B21D *53/00*
U.S. Cl. 29—157 C 4 Claims



1. A process for constructing a fuel injection nozzle device which is constructed such that its nozzle spray hole temperature can be maintained at a reduced level during use, the process comprising providing an injection nozzle body which includes at least one spray hole therethrough; providing a hood which is shaped and sized to fit over the injection nozzle body such that an annular gap can be created therebetween, the hood including at least one spray orifice extending therethrough, each capable of alignment with a respective spray hole in the injection nozzle body; filling the hood with an initially pourable material that is capable of being hardened by precipitation and which has a low heat conductivity after hardening; inserting the injection nozzle body into the hood

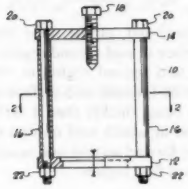
containing the initially pourable material such that an annular gap is formed between the injection nozzle body and the hood which contains the initially pourable material and each spray hole is aligned with a spray orifice; fastening the so-positioned injection nozzle body to the hood; hardening the heat insulating material by precipitation; and inserting a tool into each spray orifice from outside the hood to clear each spray orifice and each spray hole aligned therewith and provide a channel therebetween through the hardened heat insulating material.

4,502,197

SEAL RETAINER INSTALLING AND REMOVING TOOL

W. Dale Harder, 3744 Kelly St., Fort Myers, Fla. 33901

Filed Mar. 22, 1983, Ser. No. 477,832
Int. Cl.³ B23P *19/04*
U.S. Cl. 29—259 **3 Claims**



1. A tool for installing and removing seal retainers of the type used in connection with constant velocity joint assemblies and associated outboard seals on the drive axles of front wheel drive automobiles, comprising:

an essentially flat C-ring for engaging the seal retainer to be installed or removed, said C-ring being provided with a recessed portion along its circumference and an opening there through which is no larger than necessary for positioning said C-ring around the shaft of the constant velocity joint assembly with which the seal retainer to be installed or removed is associated such that said recessed portion of said C-ring engages said seal retainer along essentially its entire circumference;

an essentially flat crossbar positioned parallel to said C-ring;

a pair of identical, parallel, elongated spacers positioned perpendicular to and between said C-ring and said crossbar, each of said spacers having one of its ends attached to said C-ring and the other of its ends attached to said crossbar; and

a thumbscrew operatively positioned in a threaded hole through said crossbar for engaging the free end of the shaft of the constant velocity joint assembly with which the seal retainer to be installed or removed is associated.

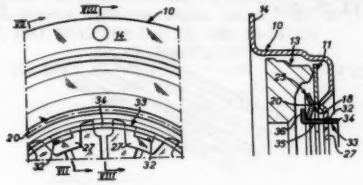
4,502,198

METHOD OF RECONDITIONING A DIAPHRAGM FRICTION CLUTCH AND RECONDITIONABLE CLUTCH MECHANISM

René Billet, Lamorlaye, France, assignor to Societe Anonyme Francaise Du Ferodo, Paris, France

Filed Mar. 13, 1979, Ser. No. 20,071
Claims priority, application France, Mar. 24, 1978, 78 08724
Int. Cl.³ F16D *13/64*; B23P *6/00*
U.S. Cl. 29—402.08 **4 Claims**

1. Method for reconditioning diaphragm friction clutches of the type comprising an annular cover member, an annular diaphragm spring having a peripheral portion formed as a Belleville washer and a central portion divided into radial fingers, and assembly means rockably mounting the spring on the cover member, the assembly means comprising lugs formed integrally with the cover member and passing through passages formed at the bases of the radial fingers and therebetween, the lugs having bent end portions effectively bearing against the peripheral portion of the diaphragm spring; wherein said method comprises the steps of disengaging the lugs so as to afford access to the diaphragm spring, providing new assembly means for selectively rockably mounting either the original diaphragm spring or a new diaphragm spring and inserting said new assembly means through a plurality of apertures formed in the cover member in circumferentially spaced relation to said lugs on a circle along which said lugs lie, securing said new assembly means to the cover member, and severing the lugs to remove their radial end portions so that the remaining axial portions of the lugs are long enough to be received in the passages of the original diaphragm spring or the new diaphragm spring once the clutch is reassembled for radially supporting and centering the diaphragm spring.

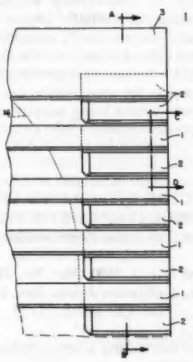


4,502,199

INSERTING SELF-THREADED RODS INTO WOODEN BODIES

Angel A. Basarte, Serapio Huici, 17, Villava (Navarra), Spain

Filed Jun. 10, 1982, Ser. No. 387,269
Claims priority, application Spain, Mar. 31, 1982, 511.026
Int. Cl.³ B23P *19/04*
U.S. Cl. 29—433 **14 Claims**

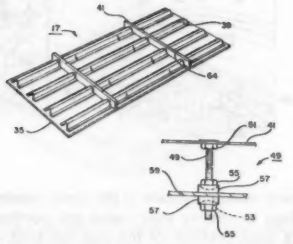


1. A method for the assembly of a plurality of wooden bodies, comprising drilling a hole in each said body, and with the holes in the respective bodies in alignment with each other, inserting through the holes from body to body a rod having screw threads thereon whose external diameter is slightly greater than the diameter of the holes, and pressing the rod into the holes the full length of the rod while turning the rod to tap screw threads on the interior of the holes.

4,502,200
METHOD OF PREPARING LIGHTWEIGHT MIRROR MODULE

Alfred J. Anderson, and Robert J. Thomas, both of Littleton, Colo., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 8, 1982, Ser. No. 355,852
Int. Cl.³ B23P 19/00
U.S. Cl. 29—526 R **4 Claims**



1. A method of preparing a mirror module for a heliostat or the like for reflecting solar energy onto a collector, which includes laying a mirror face down on a firm supporting bed and attaching a supporting structure to the backside of the mirror, the improvement comprising the steps of:

a. adhesively connecting a plurality of longitudinally extending beams to the backside of the mirror so as to provide a region of support longitudinally of said mirror at least each six inches of transverse distance of said mirror; said longitudinally extending beams being connected and having sufficient strength to support said mirror cantilevered from a heliostat main support structure; said longitudinally extending beams having a cross-sectional shape of the so-called hat type and having brim areas of said beams adhered to the back side of said mirror so as to provide said longitudinal region of support on each edge of said longitudinally extending beam; and having a dimension such that there is no more than six inches space between any region of support longitudinally of said mirror in order that said mirror have the requisite hail resistance;

b. connecting a plurality of transversely extending beams to said longitudinally extending beams carrying said mirror; said plurality of transversely extending beams being adapted to share substantially evenly the weight of said mirror and said longitudinally extending beams and minimize torsional effects in said mirror module; and

c. affixing to said transversely extending beams a plurality of attachment means for attaching to the heliostat structure; said attachment means being adapted to minimize flexure and hold a predetermined shape of said mirror module.

4,502,201
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE AND FABRICATION METHOD THEREOF

Akira Muramatsu, Takasaki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

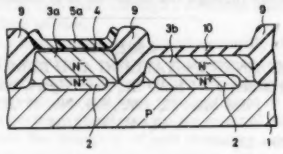
Filed Dec. 1, 1981, Ser. No. 326,278
Claims priority, application Japan, Dec. 1, 1980, 55-168044
Int. Cl.³ H01L 21/76
U.S. Cl. 29—571 **14 Claims**

1. A method of fabricating a semiconductor integrated circuit device comprising:

(a) oxidizing predetermined regions of a semiconductor layer to form an oxide layer to an intermediate depth of said semiconductor layer in the direction of its thickness, thereby to divide said semiconductor layer into a first region in which a normal transistor is to be formed and a second region in which an inverse transistor is to be formed;

(b) covering the first region in which a normal transistor element portion is to be formed with an oxidation-resistant mask while leaving the second region in which said inverse transistor is to be formed uncovered; and

(c) further oxidizing the predetermined regions of said semiconductor layer to make said oxide layer penetrate through said semiconductor layer in the direction of its thickness, thereby isolating the first and second regions

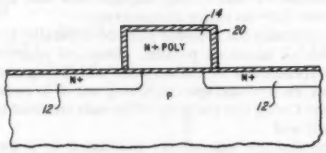


from each other, and, at the same time, oxidizing the uncovered surface of said second region to form a surface oxide film of said second region in which said inverse transistor is to be formed, said surface oxide film of said second region being thicker than a surface oxide film of said first region in which said normal transistor element portion is to be formed so that said second region is made thinner than said first region.

4,502,202
METHOD FOR FABRICATING OVERLAID DEVICE IN STACKED CMOS

Satwinder Malhi, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 17, 1983, Ser. No. 505,155
Int. Cl.³ H01L 21/265, 29/98, 21/00
U.S. Cl. 29—571 **5 Claims**



1. A method for fabricating a stacked CMOS device, comprising the steps of;

providing a substrate;

growing a gate oxide on said substrate;

forming a gate electrode in desired gate locations, said gate electrode being formed to have substantially vertically sidewalls in desired gate locations;

depositing and anistropically etching a dopant source material, to provide sidewall filaments of said dopant source adjacent to said sidewalls of said gate electrode;

depositing a thin polysilicon layer over all, said thin polysilicon layer being insulated from said gate electrode and comprising a second-type dopant;

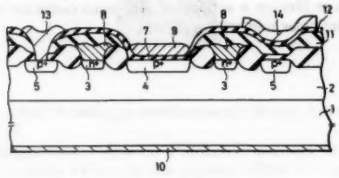
providing a mask over said gate electrode, said mask being wider than the width of said gate electrode, and implanting a heavy concentration of a second-conductivity type dopant into said thin polysilicon layer;

whereby said gate electrode addresses both a field effect transistor having first-type sources and drains in said substrate, and a field effect transistor having second-type sources and drains and a polysilicon channel.

4,502,203
METHOD FOR FABRICATING SEMICONDUCTOR PHOTODETECTOR

Junichi Nishizawa, No. 6-16, Komegafukuro 1-chome, Sendai-shi, Miyagi; Soubei Suzuki, and Takashige Tamamushi, both of Miyagi, all of Japan, assignors to Junichi Nishizawa, Japan

Filed Dec. 13, 1983, Ser. No. 561,243
Claims priority, application Japan, Dec. 13, 1982, 57-218590
Int. Cl.³ H01L *21/22, 148/187*
U.S. Cl. 29—571 4 Claims



1. A method for fabricating a photodetector comprising at least one vertical type static induction transistor, comprising the steps of:

a. forming an oxide layer and a nonoxidizing layer on a first main surface of a silicon wafer;

b. removing portions of at least said nonoxidizing layer from predetermined regions of said first main surface where a control gate region, a shielding gate region surrounding said control gate region and a first main electrode region between said gate regions are to be formed;

c. selectively oxidizing said predetermined regions to form a field oxide layer;

d. removing at least portions of said nonoxidizing layer from regions where said control gate region and said shielding gate region are to be formed to form said control gate region and said shielding gate region, each comprising an oxide layer on said first main surface;

e. removing portions of said nonoxidizing layer and said oxide layer from the area on said first main surface where said first main electrode region is to be formed;

f. forming an electrode of a first conductive material in said area where said first main electrode region is to be formed;

g. covering the entirety of said first main surface of said silicon wafer with a first insulating layer;

h. removing portions of said first insulating layer and said oxide layer on said control gate region;

i. covering the entirety of said first main surface of said silicon wafer with a second insulating layer;

j. forming an electrode of a second conductive material on said second insulating material layer on said control gate region;

k. removing portions of said second insulating layer, said first insulating layer and said oxide layer on said shielding gate region to form at least one contact hole;

l. covering the entirety of the first main surface of the silicon wafer with a metal layer;

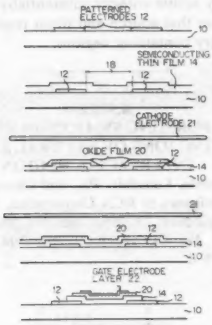
m. removing at least a portion of said metal layer on said control gate region; and

n. forming an electrode for said second main electrode region on said main surface of said silicon wafer.

4,502,204
METHOD OF MANUFACTURING INSULATED GATE THIN FILM FIELD EFFECT TRANSISTORS

Seigo Togashi, and Kanetaka Sekiguchi, both of Tokorozawa, Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 398,126, Jul. 14, 1982, abandoned. This application Jun. 15, 1984, Ser. No. 621,324
Claims priority, application Japan, Jul. 17, 1981, 56-112025; Aug. 25, 1981, 56-132860; Dec. 22, 1981, 56-207736
Int. Cl.³ H01L *21/203*
U.S. Cl. 29—571 4 Claims



1. A method of manufacturing an insulated gate thin film field effect transistor, comprising the steps of:

forming first and second closely adjacent anodic oxidation electrodes upon an electrically insulating substrate;

forming a semiconducting layer on said insulating substrate and said first and second anodic oxidation electrodes;

performing anodic oxidation of said semiconducting layer, utilizing said first and second anodic oxidation electrodes, to thereby form a layer of oxide on said semiconducting layer;

shaping said oxide layer to form a gate insulator;

shaping said semiconducting layer to expose a portion of each of said first and second anodic oxidation electrodes;

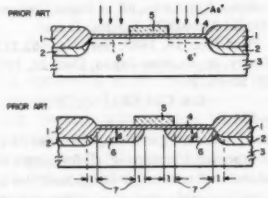
patterning exposed portions of said first and second anodic oxidation electrodes to form source and drain electrodes, respectively; and

forming an electrically conducting layer on said oxide layer of said semiconducting layer to form a gate electrode.

4,502,205
METHOD OF MANUFACTURING AN MIS TYPE SEMICONDUCTOR DEVICE

Toshi Yahano, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 20, 1983, Ser. No. 505,976
Claims priority, application Japan, Jun. 23, 1982, 57-108003
Int. Cl.³ H01L *21/265*
U.S. Cl. 29—576 B 14 Claims



1. A method of manufacturing an MIS type semiconductor

device having impurity containing regions formed in a semiconductor substrate, comprising the steps of:

(a) implanting ions of the impurity into the semiconductor substrate at a plurality of implantation energies and with an implantation dosage to form the impurity containing regions, the implantation energies and the implantation dosage being selected to provide an impurity distribution for the impurity containing regions having a peak concentration which does not exceed the electrically active solubility of the impurity; and

(b) irradiating the impurity containing regions with an energy beam to render the implanted impurity in the region electrically active without substantially redistributing the impurity, so that source and drain regions are formed in the impurity containing regions.

4,502,206

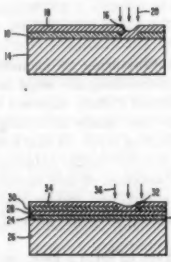
METHOD OF FORMING SEMICONDUCTOR CONTACTS BY IMPLANTING IONS OF NEUTRAL SPECIES AT THE INTERFACIAL REGION

George L. Schnable, Lansdale, Pa., and Chung P. Wu, Mercerville, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 18, 1983, Ser. No. 553,255

Int. Cl.³ H01L *21/265, 7/00*

U.S. Cl. 29—576 B **9 Claims**



1. A method of forming an ohmic contact between a layer of a conductive material and a body of a conductive material which tends to oxidize in air comprising the steps of

applying the layer of conductive material to a surface of said conductive body, and

implanting ions of a neutral material through the interface between the conductive material layer and the surface of the body to break up any oxide at the interface and thereby lower the contact resistance between the conductive layer and the body.

4,502,207

WIRING MATERIAL FOR SEMICONDUCTOR DEVICE AND METHOD FOR FORMING WIRING PATTERN THEREWITH

Jiro Ohshima, Kawasaki; Masahiro Abe, Yokohama, and Yutaka Koshino, Yokosuka, all of Japan, assignors to Toshiba Shibaura Denki Kabushiki Kaisha, Japan

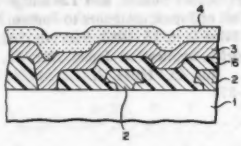
Filed Dec. 16, 1983, Ser. No. 562,212

Claims priority, application Japan, Dec. 21, 1982, 57-224168; Apr. 20, 1983, 58-68370

Int. Cl.³ H01L *21/28*

U.S. Cl. 29—576 B **2 Claims**

1. A method for forming a wiring material of a semiconductor device, comprising the steps of: (i) forming a wiring pattern comprising aluminum as a major component on a semiconductor element; (ii) ion-implanting one of boron and a mixture of boron and silicon in said wiring pattern and alloying at least a surface layer of said wiring pattern to form an alloy layer containing aluminum, boron and silicon; and (iii) forming a



protective film on a surface of said semiconductor substrate which includes said wiring pattern.

4,502,208

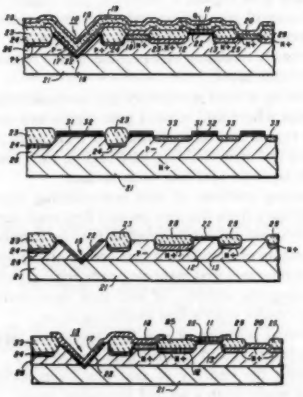
METHOD OF MAKING HIGH DENSITY VMOS ELECTRICALLY-PROGRAMMABLE ROM

Roger K. McPherson, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 319,229, Feb. 16, 1982, abandoned, which is a division of Ser. No. 626, Jan. 2, 1979, Pat. No. 4,322,822. This application Aug. 26, 1983, Ser. No. 526,515

Int. Cl.³ H01L *21/302, 21/467*

U.S. Cl. 29—584 **6 Claims**



1. A method of making an electrically programmable semiconductor device in a face of a semiconductor body comprising the steps of:

etching said face of the semiconductor body anisotropically to provide a V-shaped groove in said face,

growing a thin oxide dielectric layer in said groove,

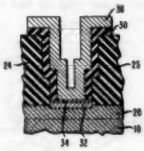
applying a conductive layer over the dielectric layer, connecting a voltage to said conductive layer of magnitude sufficient to breakdown said dielectric layer at the apex of the groove resulting in a low resistance conductive path from the conductive layer to the face of the body below such apex.

4,502,209

FORMING LOW-RESISTANCE CONTACT TO SILICON

Moshe Eizenberg, Kiryat-Ata, Israel, and Shyam P. Murarka, New Providence, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 31, 1983, Ser. No. 528,074
Int. Cl.³ H01L *23/48*
U.S. Cl. 29—589 **9 Claims**



1. A method of making a semiconductor device, comprising the steps of

depositing a film of A_xB on a surface of a device structure that includes silicon surface regions, where A is selected from the group consisting of titanium, hafnium, zirconium, tantalum and niobium, and B is selected from the group consisting of carbon, nitrogen and boron,

and heating said structure to convert those portions of the film that overlie silicon surface regions into a two-layer metallization comprising a layer of ASi_2 and an overlying layer of A_yB, where x is both greater than one and greater than y.

4,502,210

METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE

Katsuya Okumura, Yokohama; Toshinori Shinki, Tokyo; Takashi Sato, Kawasaki, and Masaaki Ueda, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Jun. 8, 1983, Ser. No. 502,265
Claims priority, application Japan, Jun. 28, 1982, 57-111128
Int. Cl.³ H01L *23/48, 23/50*
U.S. Cl. 29—591 **12 Claims**

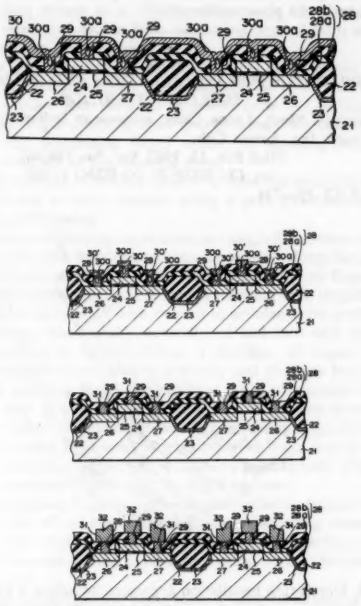
1. A method for manufacturing a semiconductor device having a lateral area of 1.5 μm square or less and a depth of 1.0 to 1.5 μm, comprising the steps of:

(a) selectively removing an insulating film which covers at least one conductive layer to form at least one contact hole partially exposing said conductive layer;

(b) forming a layer of an inorganic conductive material on an entire surface of said insulating film which includes said contact hole, said inorganic conductive material having a melting point lower than the melting point of the material comprising said conductive layer;

(c) melting said inorganic conductive material layer sufficiently to fill said contact hole with said inorganic conductive material;

(d) removing portions of said inorganic conductive material layer remaining on said insulating film after said inorganic conductive material layer is melted, thereby providing a columnar body filling said contact hole and comprising said inorganic conductive material; and



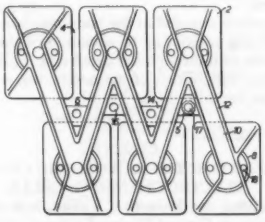
(e) forming a wiring layer in contact with said columnar body.

4,502,211

ASSEMBLING ELECTRIC STORAGE BATTERIES AND A CLAMP THEREFOR

Michael H. Hayes, Wilmslow, and Ernest J. Pearson, Swinton, both of England, assignors to Chloride Group Public Limited Company, London, England

Filed Oct. 31, 1983, Ser. No. 547,213
Claims priority, application United Kingdom, Oct. 29, 1982, 8230957; Jul. 14, 1983, 8319049
Int. Cl.³ H01M *10/14*
U.S. Cl. 29—623.1 **10 Claims**



1. A method of assembling an electric storage battery comprising forming a plurality of cell packs, each cell pack comprising alternating positive and negative plates interleaved with separator material, the plates of the cell packs lying in substantially common parallel planes, placing each end surface of each cell pack that is parallel to the plane of the plates in contact with a respective clamping element of one of two clamping members of a clamp, said clamp comprising two

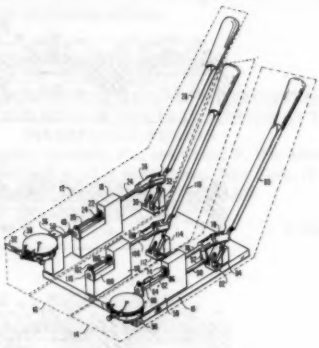
spaced opposing clamping members with each clamping member having a plurality of clamping elements which are interconnected but spaced apart and urging the two clamping members together to compress each cell pack simultaneously transverse to the planes of its plates.

4,502,212

APPARATUS FOR INSTALLATION AND REMOVAL OF DRILL DEPTH RINGS

Larry N. Meek, Lyons, Colo., assignor to Indian Valley Company, Inc., Lyons, Colo.

Filed Feb. 12, 1982, Ser. No. 348,662
Int. Cl.³ B23P *21/00*; B23Q *15/00*
U.S. Cl. 29—721 **5 Claims**



1. Depth ring installation apparatus including a mechanism for precisely installing a depth ring on the shank of a drill a specified distance from the tip of the drill, the mechanism comprising:

a base member;

a body member connected to the base member, the body member including drill guide means for supporting a drill in position for translational motion along the axis of the drill, and depth ring support and retention means for retaining the depth ring in a fixed position proximate to one end of the drill and in substantial axial alignment with the drill, the body member further including push rod means positioned for translational motion in substantial axial alignment with the depth ring and the drill;

lever means connected to the base member and coupled to the push rod means for applying the push rod means against the end of the drill distal to the depth ring, whereby the drill is urged partially through the depth ring; and

indicator means coupled to the body member, the indicator means being responsive to actuation of the lever means urging the drill through the depth ring for measuring and indicating the position of the depth ring with respect to the tip of the drill.

4,502,213

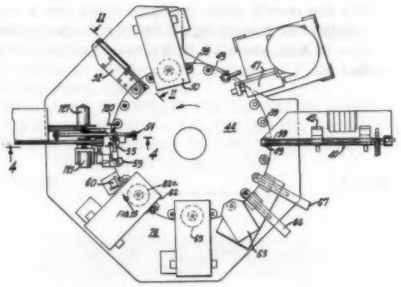
APPARATUS FOR THE AUTOMATIC CLOSURE OF ELECTROCHEMICAL CELLS

James A. Madden, and Kenneth C. LeDuc, both of Gainesville, Fla., assignors to General Electric Company, Gainesville, Fla.

Continuation-in-part of Ser. No. 271,235, Jun. 8, 1981, abandoned, which is a continuation of Ser. No. 55,978, Jul. 9, 1979, abandoned. This application Aug. 4, 1981, Ser. No. 289,996
Int. Cl.³ B23P *19/00*
U.S. Cl. 29—730 **37 Claims**

1. In apparatus for automatically assembling the components of electrochemical cells on a production line basis, wherein such cells each include a cell casing, an electrode assembly contained in the casing and an electrical conductor tab connected between the electrode assembly and a cover member which closes the cell and forms an electrical terminal therefor, the combination of:

cell indexing means having a plurality of locations for retaining and transporting cells through a plurality of operative stations, said plurality of stations including a loading station for loading the cells, an intermediate welding station for performing a welding operation and an ejection station for ejecting the cells, the casings each containing an electrode assembly having a conductor tab extending therefrom toward the open end of the cell casing;



cover assembly indexing means for receiving and transporting a plurality of cover assemblies from a loading location associated with said cover assembly indexing means to a welding location associated with the welding station in synchronism with said cell indexing means, said cover assembly indexing means being so located and operative to position a cover assembly at each cell casing reaching the welding location, the positioned cover assembly being aligned with the conductor tab associated with the cell casing at said welding station; and

welding means associated with the welding station for mechanically and electrically connecting said conductor tab to said cover assembly at said welding station.

4,502,214

METHOD OF MAKING REFERENCE ELECTRODE

Ronald C. Miles, Cleveland; George W. Geren, Georgetown, and R. W. Peel, Tellico Plains, all of Tenn., assignors to Olin Corporation, Cheshire, Conn.

Filed Apr. 29, 1982, Ser. No. 373,205
Int. Cl.³ G01N *27/30*
U.S. Cl. 29—859 **19 Claims**

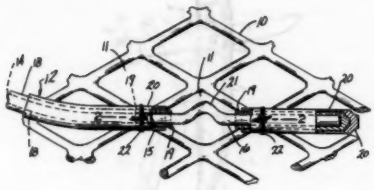
1. A method of making a wire reference electrode comprising:

(a) fastening a lead-in wire to a reference wire portion;

(b) cleaning the reference wire portion with acetone;

(c) washing the reference wire portion with soap and water;

(d) etching the reference wire portion in a concentrated acid solution for a predetermined period of time;
(e) rinsing the reference wire portion with deionized water for a predetermined period of time;
(f) applying a coating of ruthenium chloride solution;
(g) heating the wire reference electrode at a temperature from about 300° C. to about 500° C. for a predetermined period of time;
(h) repeating substeps (f) and (g) a predetermined number of times;



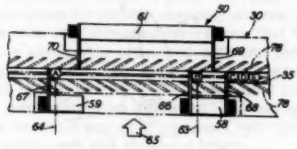
(i) surrounding at least a portion of the lead-in wire and a portion of the reference wire portion with a fluorinated ethylene polymer sealing means;
(j) surrounding at least a portion of the sealing means with a heat shrinkable means collapsible thereabout; and
(k) heating the fluorinated ethylene polymer sealing means and the heat shrinkable means with heating means for a predetermined period of time until the heat shrinkable means collapses about the fluorinated ethylene polymer sealing means to form a liquid-tight seal and an electrically insulating covering about the lead-in wire and a portion of the reference wire portion.

4,502,215

FEEDING ARTICLES TO SUCCESSIVE STATIONS FOR TREATMENT

Charles L. Davis, Mohnton; Charles R. Fegley, Laureldale, and Jack H. Moll, Jr., Oley, all of Pa., assignors to AT&T Technologies, Inc., New York, N.Y.

Filed Dec. 20, 1982, Ser. No. 451,357
Int. Cl.³ H01R *43/00*; B23P *23/04*; B65G *51/02*
U.S. Cl. 29—874 **17 Claims**



1. Apparatus for feeding ones of articles and positioning the same at one or more stations along a path traversed by the articles, comprising;
means for guidably advancing the articles in a single file manner to and beyond the stations successively located along the path;
means for shuttling transversely of the path, a plurality of fingers simultaneously in a cycle from a working state to and from a transitory state with respect to articles in the path;
a plurality of fingers, each engaged to said shuttling means and extending substantially normally of and into said path in response to said shuttling including:
an indexing finger for blocking a file of waiting articles and, at a first station in the path and at any successive station desired thereafter, a positioning finger for positioning an article for treatment, all such fingers extending from a first side of and into the path when the shuttling means is in the working state;
at each respective station, a detaining finger extending from a second side of and into the path when the shuttling means is in the transitory state for blocking a respective article from advancing beyond such station during the shuttling; and
the detaining finger at the first station being spaced from the indexing finger a distance suitable to cooperatively capture therebetween an article from the waiting file during a shuttling cycle and to release the same to the first positioning finger when the shuttling means is returned to the working state.

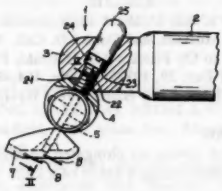
11. A method of feeding ones of articles and positioning the same at one or more stations along a path traversed by the articles, comprising:
guidably advancing the articles in a single file manner to and beyond the stations successively located along the path;
shuttling transversely of the path, a plurality of fingers simultaneously in a cycle from a working state to and from a transitory state with respect to articles in the path;
thrusting substantially normally of and into said path in response to said shuttling, a plurality of fingers, each engaged to said shuttling means, said plurality including:
an indexing finger for blocking a file of waiting articles and, at a first station in the path and at any successive station thereafter, an article positioning finger for positioning an article for treatment all such fingers being extended from a first side of and into the path when the shuttling means is in the working state;
a detaining finger at each respective station, from a second side of and into the path when the shuttling means is in the transitory state for blocking a respective article from advancing beyond the station during the shuttling; and
the indexing finger being spaced from the detaining finger at a first station, a suitable distance along the path to accommodate the width of an article therebetween such that the indexing finger and the first detaining finger cooperatively capture therebetween an article from the waiting file during a shuttling cycle and release the same to the first positioning finger when the shuttling means is returned to the working state.

4,502,216

SAFETY RAZOR PROVIDED WITH AN ARTICULATED HEAD

Giuseppe Furnari, Paderno Dugnano, Italy, assignor to Tonal S.a.S. di Furnari Giuseppe & C., Italy

Filed Jun. 14, 1982, Ser. No. 388,191
Claims priority, application Italy, Jul. 21, 1981, 22413/81[U]
Int. Cl.³ B26B *21/00, 21/14*
U.S. Cl. 30—50 **1 Claim**



1. A safety razor provided with an articulated head comprising a handle at one end of which is rigidly connected a head, a pair of movable, facing hooks disposed at the ends of said head and means suitable to allow the removable engagement of said hooks within suitable housings obtained in a blade-holder base, characterized in that said hooks are pivotally mounted on corresponding pivot pins integral to the head and project along a certain portion from corresponding slots formed in the same

head, said slots defining the stroke of said hooks from a first position of maximum mutual approaching to a second position of maximum spacing, said first position being obtained by way of an extension spring acting between said hooks, further characterized in that said head comprises a substantially cylindrical and hollow body provided with a projecting portion having a threaded through hole into which is screwed a securing screw housed in a corresponding hole formed in said end of the handle, said hole being closed, above the securing screw, by a plug or the like.

4,502,217

SHAVING INSTRUMENT

Friedrich Schlichter, Draschestrasse 31, A-1232 Vienna, Austria

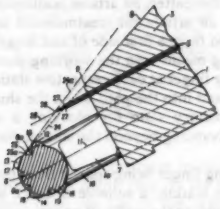
PCT No. PCT/AT81/00007, § 371 Date Dec. 9, 1981, § 102(e) Date Dec. 9, 1981, PCT Pub. No. WO81/02864, PCT Pub. Date Oct. 15, 1981

PCT Filed Apr. 10, 1981, Ser. No. 333,858

Claims priority, application Austria, Apr. 10, 1980, 1946/80

Int. Cl.³ B26B *21/14*

U.S. Cl. 30—82 **8 Claims**



7. A shaving instrument comprising a holding part of plastics material having a glide surface facing the skin to be shaven and a guard bar of metal coming into contact with the skin, said guard bar connected to said holding part, said guard bar provided with a plurality of elements with sharp edges for stretching the skin, wherein said stretching elements having file-like or rasp-like teeth with sharp edges, and wherein pits are provided in the surface of said guard bar in front of each of said teeth, the front faces of said teeth extend directly into said pits and constitute one of the walls of said pits.

4,502,218

BLADE SHARPENER INSERT FOR KNIFE SCABBARD

Larry D. Carter, Mosinee, and Daniel D. Call, Athens, both of Wis., assignors to Oy Fiskars AB, Helsinki, Finland

Filed Dec. 29, 1982, Ser. No. 454,466

Int. Cl.³ B25F *3/00*; B26B *11/00*; B24D *5/00*

U.S. Cl. 30—138 **9 Claims**

1. In combination:

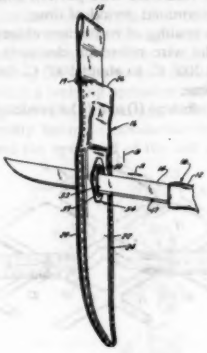
a knife scabbard having an elongated passage open at one end for accommodating a blade of a knife carried in said scabbard

and knife blade sharpening means for said scabbard comprising:

an opening extending transversely through said scabbard and through said passage therein;

insert means insertable into said passage and having a blade-sharpening slot extending therethrough and having a portion in registry with said opening in said scabbard;

and at least one blade-sharpening element mounted on said insert means and overlying a portion of said slot in said insert member for sliding engagement with a knife blade



to be sharpened and inserted through said opening in said scabbard and through said blade-sharpening slot.

4,502,219

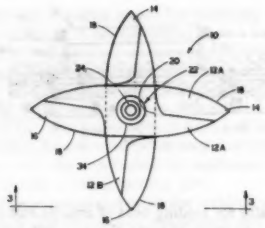
FOLDING THROWING KNIFE

Gilbert W. Hibben, 2703 Costigan Way, Louisville, Ky. 40223

Filed Sep. 28, 1982, Ser. No. 425,168

Int. Cl.³ B26B *5/00, 19/14*; A63B *65/08*

U.S. Cl. 30—153 **9 Claims**



1. A foldable throwing knife comprising:

a plurality of blades;

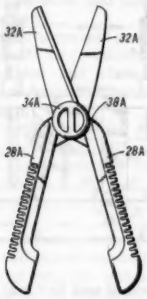
interconnecting means for holding said blades together and allowing selected relative pivotal movement of said blades between a folded stored position in which said blades are in a stacked overlaying relationship, and an unfolded throwing position in which said blades are at a predetermined angular displacement relative to each other, said interconnecting means includes biasing means for resiliently biasing said blades toward each other; and,

means associated with said blades for holding said blades at the predetermined angular displacement and in coplanar relationship.

4,502,220
HAND-HELD TYPE OPENING AND CLOSING ACTION TOOL

Takaaki Aoki, 8-D-329, 8-2-Chome, Nakatsu, Ohyodo-Ku, Osaka-Shi, Osaka-Fu, Japan

Filed Dec. 10, 1982, Ser. No. 448,602
Claims priority, application Japan, Dec. 10, 1981, 56/199724; Dec. 10, 1981, 56/199725
Int. Cl.³ B26B *13/00*
U.S. Cl. 30—154 6 Claims



1. A hand-held type opening and closing action tool, comprising:

an arcuate spring;

upper and lower elongated operating levers having front and rear ends, said front ends being pivotally connected by said spring, such that the action of said spring biases said rear ends apart and said rear ends contact each other when pressed together, said levers presenting an elongated guide hole therebetween when closed when said rear ends are touching each other;

right and left front active pieces, each having a rear mounting portion;

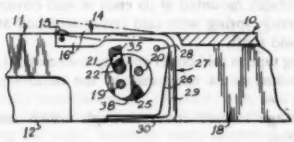
a clamping pivot pin extending transversely through said active pieces at a point adjacent said rear mounting portions for pivotally connecting said active pieces together such that said active pieces form an X-shaped assembly for scissor-type action, said pivot pin also extending transversely across said elongated guide hole; and

engagement means for slidably engaging said rear mounting portions with said elongated levers such that the active pieces are operatively connected with and operable for opening and closing operation by said elongated levers, and such that in the closed state, said pivot pin may be moved rearwardly from a position near said spring to a position near said rear ends to retract said closed active pieces within with said elongated levers.

4,502,221
LOCKING KNIFE WITH THUMB LATCH

Leon M. Pittman, Rte. 1, Box 67, Pendergrass, Ga. 30567

Filed Apr. 29, 1983, Ser. No. 490,192
Int. Cl.³ B26B *1/04*
U.S. Cl. 30—160 11 Claims

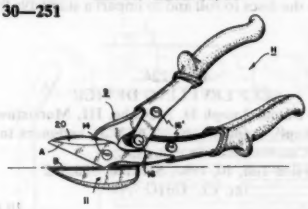


1. A locking knife, including a blade, a handle defining a blade receiving cavity, said blade being pivotally carried by said handle to be selectively received within said cavity, characterized by a cam fixed with respect to said handle, an opening defined in said blade for receiving said cam therein, a latch arm pivotally carried by said blade, a cam follower fixed to said latch arm for engaging said cam, spring means for urging said cam follower towards said cam, a locking portion defined on said cam follower, said cam defining a locking notch therein, said locking notch of said cam being alignable with a notch in said blade, said notches being aligned when said knife is open so that said locking portion of said cam follower is positioned in said notches to prevent rotation of said blade with respect to said cam.

4,502,222
SHEARS FOR CUTTING SHEET METAL

Claud B. Sargent, Visalia, Calif., assignor to Michael P. Breston, Houston, Tex., a part interest

Filed Dec. 6, 1982, Ser. No. 447,093
Int. Cl.³ B26B *13/06*
U.S. Cl. 30—251 4 Claims



1. Shears for cutting sheet material, comprising:

(1) a lower lever of unitary and integral construction and having:

(a) a blade having a cutting edge;

(b) a front surface;

(c) a back shear surface;

(d) an end surface which tapers rearwardly from said shear surface toward said front surface to enable said shears to swing to the left for cutting a leftward curve in said material; and

(e) a hinge hub which is laterally offset with respect to said cutting edge, said hub including a lower leg, and an intermediate center portion defining a transverse pivot bore and a planar bearing surface;

(2) an upper lever of unitary and integral construction and having:

(a) a blade having a cutting edge, a hinge hub extending rearwardly from said cutting edge and defining a transverse pivot bore and a bearing surface; and

(b) said blade, said hinge hub, and said handle all being substantially in longitudinal alignment; and

(3) a pivot extending through said bores for pivotably interconnecting said upper and lower levers.

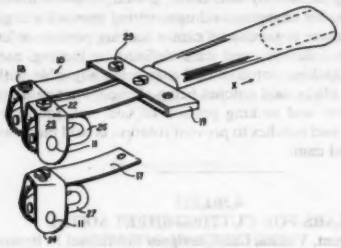
4,502,223
HAND TOOL WITH TOOTHED ROTORS FOR DISLODGING MATERIAL FROM A SURFACE

Peter A. M. Brookfield, 7/16 Atkin Ave., Mission Bay, Auckland, New Zealand

Filed Oct. 19, 1982, Ser. No. 435,307
Claims priority, application New Zealand, Oct. 19, 1981, 198688
Int. Cl.³ A47L *13/08;* B26F *1/32*
U.S. Cl. 30—365 11 Claims

1. A hand tool for dislodging material from a surface to which it is adhered, comprising at least one pair of rotatably mounted opposed gripping discs with sharp teeth about their peripheries, the discs of each pair being spaced apart from each other and rotatable on axes angled relative to each other and to the direction of travel, all the points of the teeth of all the discs

lying on a common imaginary elliptical sheath, the points of the teeth of each disc moving in a circular path upon rotation



of the discs, whereby, in use, motion of the tool along a surface will cause all the discs to roll and to impart a sideways force on the surface.

4,502,224

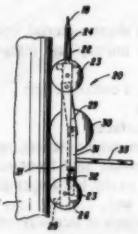
SELF LEVELING DEVICE

Alan Davies, Union; Joseph H. McCabe, III, Morristown, and Steven J. Kopil, Bridgewater, all of N.J., assignors to E. W. Saybolt & Co., Inc., Kenilworth, N.J.

Filed Jun. 10, 1983, Ser. No. 503,382

Int. Cl.³ G01C *7/06*

U.S. Cl. 33—1 V **10 Claims**



1. A self leveling device adapted to be moved along a substantially vertical wall comprising,

a base assembly adapted to be moved up and down along and adjacent to the vertical wall,

a roller assembly pivotally connected to said base assembly and being adapted to be in continuous contact with the vertical wall as the base assembly is being moved up and down along and adjacent to the vertical wall,

weight means pivotally connected to said roller assembly, and

a horizontal member connected to said weight means perpendicular to an imaginary vertical line extending through the weight means.

4,502,225

MECHANICAL SCRIBER FOR SEMICONDUCTOR DEVICES

Peter T. Lin, East Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 6, 1983, Ser. No. 492,043

Int. Cl.³ B43L *13/00*

U.S. Cl. 33—18 R **4 Claims**

1. A mechanical scriber for scribing a layer of material of a device comprising:

(a) a fixed planar support;

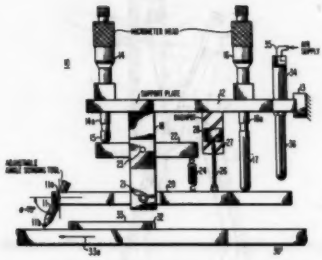
(b) a scribing tool;

(c) a first arm pivotal about a first axis spaced from and generally parallel to the plane of said support;

(d) a second arm pivotal about a second axis parallel to said first axis;

(e) said tool being connected to one end of said first arm and a spring connected between the other end of said first arm and one end of said second arm;

(f) cutting depth adjusting means comprising a first extensible member adjustable by first micrometer means to



contact the other end of said first arm to limit the pivot thereof and thereby limit the cutting depth of said tool to a precise desired depth; and

(g) scribing force adjusting means comprising a second extensible member adjustable by second micrometer means to contact the other end of said second arm to adjust selectively the force of said spring to limit the scribing force of said tool to a precise predetermined value.

4,502,226

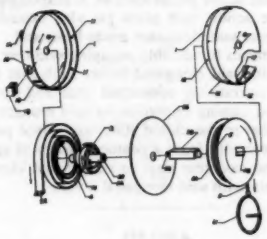
MEASURE TAPE AND KEY CHAIN COMBINED DEVICE

Kuo-Liang Hung, No. 48, Lane 21, Fu Te 3rd Rd., Kaohsiung, Taiwan

Filed Mar. 3, 1983, Ser. No. 471,710

Int. Cl.³ G01B *3/10*

U.S. Cl. 33—138 **5 Claims**



1. A combined tape measure and key chain device comprising:

a hollow cover;

a shaft rotatably mounted at its ends in said cover;

a spiral torsion spring with said cover attached at its inner end to said shaft;

a measuring tape in said cover spirally coiled about said shaft and attached at its inner end to the outer end of said spring;

a tape passage in said cover through which said tape is extendable;

a step means on the outer end of said tape to prevent said outer end from being drawn inside said cover;

a key chain in said cover spirally coiled about said shaft;

means to fix said chain at its inner end to said shaft;

a key chain passage in said cover through which said key chain is extendable;

a stop means on the outer end of said key chain to prevent said outer end from being drawn inside said cover; and

a push button control to selectively brake and release said tape and chain, so that either said tape or chain may be uncoiled and extended from said cover and recoiled by said spiral spring comprising;

a push button slidably mounted in said push button mounting member,

a clamping member on the inner end of said push button, said tape extending between said clamping member and said mounting member,

a spring mounted between said push button and push button mounting member to resiliently urge said push button outwardly so that said clamping member releasably clamps said tape against said mounting member to prevent recoiling thereof,

a second push button mounting member attached to and extending through said cover,

a second push button slidably mounted in said second mounting member,

a second clamping member on the inner end of said second push button,

said key chain extending between said second clamping member and said second mounting member, and

a spring mounted between said second push button and mounting member to resiliently urge said push button outwardly so that said second clamping member releasably clamps said chain against said second mounting member to prevent recoiling thereof.

4,502,227

PROCESS FOR CONTINUOUSLY DRYING AND UPGRADING OF ORGANIC SOLID MATERIALS SUCH AS, FOR EXAMPLE, BROWN COALS

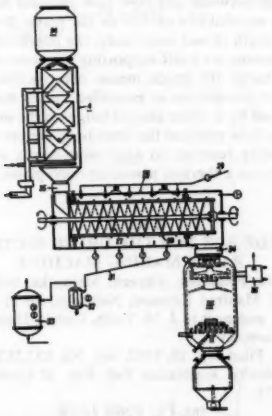
Alois Janusch, Leoben, Austria, assignor to Voest-Alpine Aktiengesellschaft, Vienna, Austria

Filed Jan. 13, 1983, Ser. No. 457,621

Claims priority, application Austria, Jan. 20, 1982, 192/82

Int. Cl.³ F26B *7/00, 5/04*

U.S. Cl. 34—12 **5 Claims**



1. In a process for continuously drying and upgrading of organic solid materials such as brown coals, said process being of the kind which includes preheating the solid materials, contacting the solid materials with saturated steam under a pressure of 5 to 45 bar and at temperatures of 150° to 260° C. with continuous removal of the expelled and condensed water and of the CO_2 formed, drying the materials by means of superheated steam in a plurality of drying stages, said process being characterized by immediately removing the materials from the last drying stage under superatmospheric pressure and introducing the materials with their sensible heat into the upgrading stage.

4,502,228

APPARATUS FOR DRYING PRINTED OR COATED WEBS

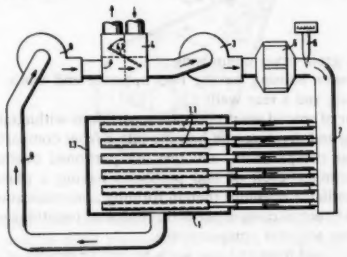
Helmut Helbig, Lengerich, and Manfred Verlemann, Ibbenbüren, both of Fed. Rep. of Germany, assignors to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed May 24, 1982, Ser. No. 381,638

Claims priority, application Fed. Rep. of Germany, May 25, 1981, 3120738

Int. Cl.³ F26B *13/02*

U.S. Cl. 34—47 **5 Claims**



1. An apparatus for drying printed or coated webs in a series-connected drying cycle, the apparatus comprising:

a bridge dryer mounted on a bridge between a printing press and a take-up roller for final drying of the printed or coated webs, the bridge dryer including a drying chamber into which the webs and heated air are introduced, the drying chamber having inlet and outlet slots for passage of the webs therethrough and having means for blowing heated air onto the webs as the webs pass through the chamber to thereby dry the webs by removing solvent therefrom;

a plurality of individual printing unit dryers mounted among printing units of a printing press having a plurality of printing units for drying the printed or coated webs after contact thereof with each printing unit, each printing unit dryer including a drying hood into which the webs and heated air are introduced, each drying hood having inlet and outlet slots for passage of the webs therethrough and having means for blowing heated air onto the webs as the webs pass through the drying hood to thereby dry the webs by removing solvent therefrom, wherein the drying hoods are fluidly connected in parallel by fluid connection means such that heated air circulated from the bridge dryer is introduced and flows therethrough in parallel;

a mixing chamber in communication with ambient air for receiving and recirculating the solvent-laden air from the dryers, for discharging solvent-laden air after a predetermined solvent concentration has been reached, and for the continuous introduction of ambient air;

a heating chamber for receiving air from the mixing chamber and for heating the air to a predetermined temperature; and

a circulating fan for sucking heated air from the heating chamber and for circulating the heated air to the bridge dryer.

4,502,229

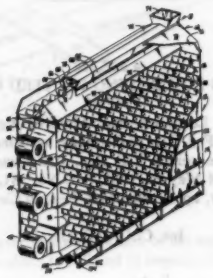
GRAIN DRYER

H. Charles Kitzman, R.F.D., Conrad, Iowa 50261

Filed May 27, 1983, Ser. No. 498,712

Int. Cl.³ F26B *17/12*

U.S. Cl. 34—56 11 Claims



1. A grain dryer comprising:

an outer housing having two opposite end walls, a front wall, and a rear wall;

a pair of spaced apart upstanding partitions within said housing and dividing said housing into a front compartment, a rear compartment, and one non-partioned central compartment, each of said partitions having a plurality of ventilator openings therein forming communication from said central compartment through said partitions into said front and rear compartments;

each of said front and rear walls having a plurality of exhaust ventilator openings forming communcation from said front and rear compartments to the exterior of said housing;

a first group of elongated ventilator members and a second group of elongated ventilator members within each of said front and rear compartments; each of said ventilator members being elongated and having in cross section an upper wall and an open lower wall, said ventilator members of said first group having one of their ends attached to one of said ventilator openings so as to permit air communication from said central compartment to the area below said upper wall of said ventilator member, said ventilator member of said second group each having one end thereof connected to one of said exhaust openings so as to permit air to communicate from beneath the upper wall to the exterior of said housing;

feed means above said front and rear compartments for depositing grain in the upper ends thereof;

conveyor means below said front and rear compartments for carrying grain away from the lower ends thereof;

a cooling fan positioned in communication with the lower end of said central compartment for forcing ambient air into said central compartment, thence into said first group of ventilator members, thence into said second group of ventilator members and thence outwardly through said exhuast vents to the atmosphere;

at least two heating fans positioned in vertical alignment above said cooling fan for forcing air under pressure into said central compartment, said heating fans having burner means associated therewith for heating the air from said fan prior to the time said air is forced into said central compartment, the burner means of the uppermost of said heating fans being adapted to heat the air exiting therefrom to a temperature substantially greater than the temperature of the air exiting from said lowermost fan;

said cooling fan being free from association with heating means whereby the air forced by said cooling fan into said central compartment is of ambient temperature.

4,502,230

APPARATUS FOR HEATING OR COOLING AND IN PARTICULAR FOR DRYING FINELY PARTICULATE SOLIDS

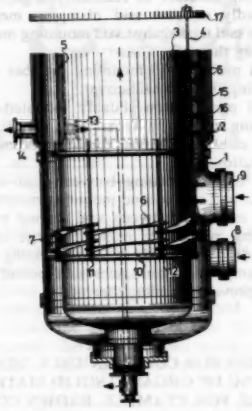
Johann Commer, Duisburg-Beeck; Wulf-Dieter Neuhaus, and Volkmar Schmidt, both of Oberhausen, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 431,974

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1982, 3202954

Int. Cl.³ F26B *17/10*

U.S. Cl. 34—57 E 5 Claims



1. In an apparatus for heating or cooling and in particular for drying finely particulate solids in a carrier gas stream conducted in a flow direction along a helical path, said apparatus comprising an externally heated and cooled flow tube concentrically surrounding a heated or cooled inner body, and guide means helically arranged in succession in said flow direction and disposed between said flow tube and said inner body and comprising aerofoil-like curved or flat plates distributed over the entire length of said inner body, the improvement wherein said guide means are a self-supporting structure not secured to said inner body, the guide means construction rests at the lower end of the tube on an enameled carrier ring, the carrier ring is formed by a collar shaped bulge on the inner body, the inside of the flow tube and the inner body are provided with an enamel coating resistant to aggressive media and the guide means comprise a thermal plastic or duro plastic material.

4,502,231

AIR GUIDE BOX FOR THE DRYER SECTION OF A PAPER MAKING MACHINE

Hans-Joachim Fissmann; Albrecht Meinecke, both of Heidenheim, and Manfred Kemmer, Nattheim, all of Fed. Rep. of Germany, assignors to J. M. Voith, GmbH, Heidenheim, Fed. Rep. of Germany

Filed Sep. 15, 1983, Ser. No. 532,353

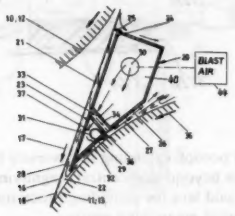
Claims priority. application Fed. Rep. of Germany, Oct. 2, 1982, 3236576

Int. Cl.³ F26B *13/08*

U.S. Cl. 34—114 7 Claims

1. An air guide box for a dryer section of a paper making machine where a paper web to be dried together with support band means meanders in a path over drying cylinders, wherein said air guide box extends longitudinally crosswise of said path of the dryer section between a first drying cylinder and a successive second drying cylinder, and wherein said air guide box extends along said support band means and into an inlet

gore, said inlet gore being formed generally by and between said support band means and said second drying cylinder, said air guide box comprising first wall means extending generally along said support band means and into said inlet gore, said first wall means extending both transversely and longitudinally of said support band means, said first wall means being spaced from said support band means and defining therebetween first gap means, air wipe-off means for operatively acting against said support band means effective for wiping-off air generally carried by said support band means as said support band means moves past said first wall means and toward said inlet gore, second wall means generally juxtaposed to a portion of the



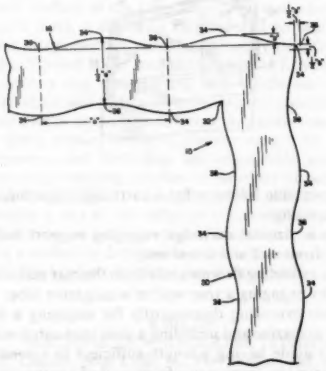
cylindrical surface of said second drying cylinder, said second wall means being spaced from said cylindrical surface and defining therebetween second gap means, said second wall means converging with said first wall means generally in the area of said inlet gore, and opening means formed in said second wall means for operative connection to an associated blast air supply, said opening means being effective to deliver blast air into said second gap means directly against said cylindrical surface of only said second drying cylinder without first flowing through said support band means and as to have a direction of flow of said blast air in said second gap means counter to running direction of said second drying cylinder.

4,502,232

CARPET LAYER'S WAVE-FORM TEMPLATE

Jack R. Broders, P.O. Box 991, Scappoose, Oreg. 97056

Filed Sep. 16, 1983, Ser. No. 532,709
Int. Cl.³ B43L *7/00*
U.S. Cl. 33—174 G **2 Claims**



1. A carpet layer's wave-form template comprising a strip of flat, rigid structural material having two legs arranged substantially at right angles to each other,

the inner and outer side edges of both legs of the strip having a uniform, wave-form contour,

the crests of the wave-form contour of the inner side edges being opposite the valleys of the wave-form contour of the outer side edges,

the width of each leg being substantially equal to one-half the wave length of the wave-form contour of the side edges of the two legs, and

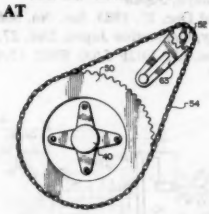
the apex of the meeting outside side edges being located in the crest portion of a component wave of the wave-form contour of one of the meeting outside side edges and in the valley portion of the wave-form contour of the other of the meeting outside side edges.

4,502,233

SHAFT ALIGNMENT APPARATUS AND METHOD

Gary L. Boitz, Willow, and Thomas C. Tulk, Wasilla, both of Ak., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 7, 1983, Ser. No. 511,620
Int. Cl.³ G01B *3/30*
U.S. Cl. 33—181 AT **5 Claims**



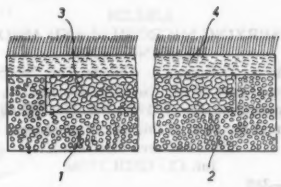
1. Apparatus for turning the shaft of an item of rotating equipment in small rotational increments comprising a chain drive consisting of a driving sprocket offset from said shaft, a driven sprocket affixed to said shaft in concentric relation thereto, a power chain linking said driving and driven sprockets; and power means for rotating said driving sprocket at a velocity such that upon the disabling of said power means the subsequent angular travel of said shaft does not exceed a predetermined maximum.

4,502,234

SYNTHETIC-RESIN BODY SUPPORT MATERIAL

Helmut Schaefer, Cerro Maggiore, Italy, and Philipp Schaefer, Hanover, Fed. Rep. of Germany, assignors to Secans AG, Zug, Switzerland

Filed Jul. 28, 1982, Ser. No. 402,597
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1981, 3129888
Int. Cl.³ B32B *3/02, 3/12, 5/22*
U.S. Cl. 36—28 **31 Claims**



1. A foamed supporting material which can be used to support a part of the human body comprising a polyaddition reaction and wide-meshed cross-linking reaction product comprised essentially of:

(a) at least one substantially saturated liquid hydrocarbon;

(b) at least one hydroxy-terminal unsaturated liquid hydrocarbon;

(c) a reactive agent reacted with with the unsaturated liquid hydrocarbon;

(d) cross-linking agent; and

(e) hollow microspheres having a thin shell consisting of a vinylidene chloride copolymer and containing a gas.

25. Foamed material according to claim 1, which is at least partially surrounded by a shaped body.

26. Foamed material according to claim 25, wherein the foamed material is received within at least one recess of the shaped body.

31. Foamed material according to claim 26, wherein the recesses are arranged at the ball portion and at the heel portion of the shoe sole.

4,502,235

CONTROL SYSTEM FOR PUSH-PULL UNIT MOUNTED ON MOTOR SCRAPER

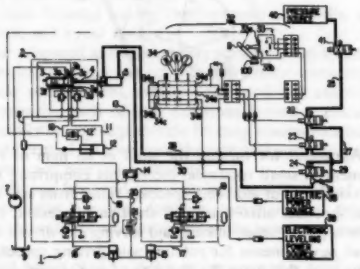
Kimio Miyake, Yokohama, and Kiyoshi Sugimoto, Kisarazu, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 27, 1983, Ser. No. 566,116

Claims priority, application Japan, Dec. 27, 1982, 57-195515

Int. Cl.³ E02F 5/00; F01L 15/00

U.S. Cl. 37—127 **7 Claims**



1. A control system for push-pull unit mounted on a motor scraper, characterized in that the control system comprises a push-pull control circuit including a bail actuating cylinder; a suspension control circuit including suspension cylinders; a directional change-over valve means adapted to change over the supply of the fluid under pressure delivered by a hydraulic pump into either one of said push-pull control circuit or said suspension control circuit in accordance with the indication of the operator; and an electric operating circuit for changing over said directional change-over valve, said electric operating circuit being connected with an electric power source.

4,502,236

CARD CARRYING MICROFILM AND ASSOCIATED READING LENS

David L. Adrian, 35 Kings Ct., Abilene, Tex. 79605

Continuation-in-part of Ser. No. 229,972, Jan. 30, 1981. This application Jun. 9, 1983, Ser. No. 502,602

The portion of the term of this patent subsequent to Jul. 19, 2000, has been disclaimed.

Int. Cl.³ G02B 27/04

U.S. Cl. 40—365 **8 Claims**

1. A data card comprising:

a thin flexible member having an information portion upon which information appears that can be read in the normal manner with the naked eye with a portion removed at one end region,

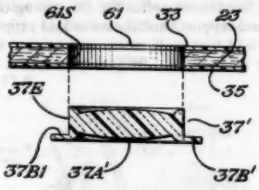
a microfilm upon which information is recorded and which is disposed at said one end region,

a pair of flexible clear plastic sheets laminating opposite sides of said thin flexible member respectively, including said microfilm,

an aperture formed through said clear plastic sheets and through said thin flexible member at an end region opposite said one end region,

a lens located in said aperture,

said lens having a central magnifying portion and an outer portion for securing said lens to said data card and in said aperture,



said outer portion extending transversely to the thin plane of said lens beyond said central magnifying portion on each side of said lens for providing protection for each side of said central magnifying portion,

said data card being flexible whereby a reader may bend said data card to align and focus the lens on the microfilm for reading the same.

4,502,237

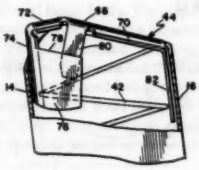
MAGAZINE FOLLOWER FOR AUTOMATIC PISTOLS

Paul M. Krogh, Burbank, Calif., assignor to Ken-Air, Inc., Sun Valley, Calif.

Filed Dec. 2, 1982, Ser. No. 446,179

Int. Cl.³ F41C 25/02

U.S. Cl. 42—50 **7 Claims**



1. A top insertable follower for a cartridge magazine, said follower comprising:

a generally horizontal cartridge engaging support surface having a front end and a rear end;

a rear guide extending downwardly from the rear end of said surface for engaging a rear wall of a magazine tube;

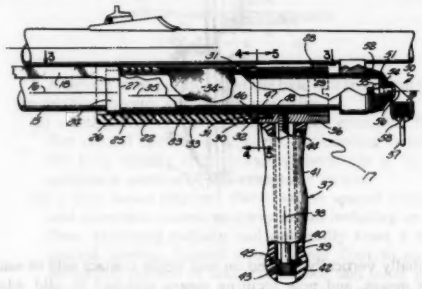
a front guide extending downwardly for engaging a front wall of a magazine and including a slide stop catch notch, said front guide having a length sufficient to extend beyond a cartridge opening in a front wall of a magazine for engaging a front wall of a magazine when said follower is in the uppermost position, said front guide includes a skirt extending around from the front along a side wall of a magazine and includes an upper surface defining said slide stop catch notch said follower being dimensioned for removal and insertion of said follower through an open top of a magazine.

4,502,238

PUMP GUN FOREND

Jack R. Farrar, Whittier, and Frank W. Farrar, Los Alamitos, both of Calif., assignors to Pachmayr Gun Works, Inc., Los Angeles, Calif.

Filed Nov. 1, 1982, Ser. No. 438,531
Int. Cl.³ F41C *23/00*
U.S. Cl. 42—72 **13 Claims**



1. An assembly for use with a pump gun having a barrel and having a magazine tube extending adjacent said barrel and essentially parallel thereto, said assembly comprising:

a pump forend adapted to be mounted about said magazine tube for manual reciprocation relative thereto essentially parallel to the barrel between forward and rear positions to prepare the gun for firing;

said forend having an outer surface to be gripped by a user's hand; and

a handle connected to said forend for reciprocation therewith and projecting generally transversely therefrom beyond said outer surface of the forend;

said forend including a tubular body to be disposed about and reciprocate relative to said magazine tube and having a shoulder at its rear end and threads at its forward end, an additional tube received about said tubular body, a ring threadedly connected to said threads at the forward end of said body and adapted to clamp said additional tube against said shoulder to secure said additional tube thereto, an essentially annular body of elastomeric material carried about said additional tube and forming said outer surface of the forend for cushioned contact with a user's hand, a detecting ring secured to said additional tube and projecting radially outwardly therefrom, a third ring disposed about said additional tube forwardly of said detenting ring and carrying said handle and adapted to turn about said additional tube between positions in which said handle projects in different directions therefrom, and a spring pressed detenting element carried by one of said detenting and third rings and engageable with different coacting detenting notches in the other of said detenting and third rings to releasably retain said third ring and handle in any of said different positions thereof, said handle having an outer portion of elastomeric material forming a resiliently deformable outer surface engageable with a user's hand to cushion contact therewith.

4,502,239

MACHINE GUN MAGAZINE LOADING

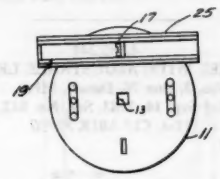
John E. Laguna, 5606 Lillie St., Fort Wayne, Ind. 46806

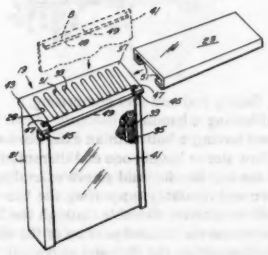
Filed Dec. 27, 1982, Ser. No. 452,936
Int. Cl.³ F42B *39/06*
U.S. Cl. 42—87 **8 Claims**

1. An apparatus for loading cartridges into a firearm magazine through a loading port thereof comprising:

first means formed generally as a rectangular parallele-piped defining a plurality of generally parallel extending elongated slots, each for receiving a laterally adjacent sequence of cartridges with each slot communicating with first and second adjacent faces of said first means;

second means comprising an elongated strip like panel slidingly received by the first means along the first face for forming a cartridge transfer path between one of said slots and the magazine loading port for transferring cartridges laterally one at a time from the one slot directly to the magazine while precluding cartridge movement from said





slots other than the selected one slot, the first and second means being relatively moveable so that the transfer path can be successively aligned with each of said slots for the successive transfer of cartridges from each of said slots in turn; and

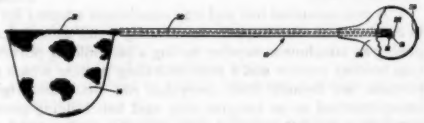
a side panel for slidingly engaging the first means along the second face to prevent inadvertent cartridge removal while allowing ready access to the first means for placing cartridges therein.

4,502,240

DIP NET AND MINNOW BUCKET AERATOR

Vernon Kapucinski, R.D. #2, Joppa Rd., Huron, Ohio 44839

Filed Jun. 30, 1983, Ser. No. 509,316
Int. Cl.³ A01K *77/00, 97/04*
U.S. Cl. 43—11 **1 Claim**



1. An improved dip net and oxygenating device for water containers, comprising;

(a) an elongated wire material formed into the shape of a closed loop and having a handle extending away from said loop to a terminating end,

(b) a net member attached to said loop,

(c) a rigid hollow tube adapted to be projected over said extending handle up where said loop begins, said terminating end bent over one end of said hollow tube thereby

engaging and retaining said hollow tube in a fixed relationship, and,

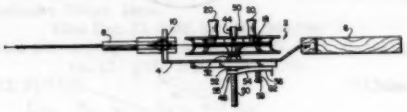
(d) a compressible flexible bulb attached to said hollow tube, in an air tight relationship said bulb having an opening thereon, and operating such that when said opening is closed and said bulb is compressed, air is thereby forced through said hollow tube in a space created between said hollow tube and said extending handle, said air being deflected by said wire loop and distributed over a wide area.

4,502,241

FISHING REEL WITH ADJUSTABLE LET-OFF LIMIT

Ray Haapala, Rte. 3, Box 76, Dassel, Minn.

Filed Sep. 14, 1983, Ser. No. 532,141
Int. Cl.³ A01K *89/00*
U.S. Cl. 43—20 **4 Claims**



1. A fishing rod and reel comprising,

a rod having a handle,

a spool having a hub with an axial bore therethrough,

a hollow sleeve having one end thereof mounted on one side of the rod handle, said sleeve extending through the hub bore and rotatably supporting the hub thereon,

a shaft lengthwise slideable through the hollow sleeve,

spline means on one end portion of the shaft for non-rotatably connecting the hub and said shaft whereby the shaft and the hub rotate together and the shaft slides lengthwise through the sleeve,

threads on the opposite end portion of the shaft,

nut means threadedly engaged on said threads for driving said shaft lengthwise in one direction or the other through the hollow sleeve in response to rotation of the shaft relative to the nut in one rotative direction or the other,

wrench means movably mounted on said rod handle for selective engagement and disengagement with the nut means,

and breaking means on said one end portion of the shaft for breakingly engaging the hub in response to lengthwise movement of the shaft in a direction to move the breaking means towards the hub.

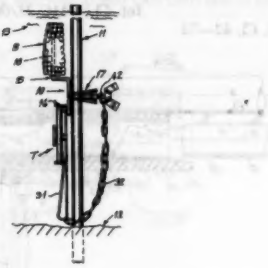
4,502,242

POLE-MOUNTED BAIT AND TRAP ATTACHMENT

Elmer D. Scherrinsky, R.R. #1, Greenup, Ill. 62428

Filed Sep. 29, 1982, Ser. No. 428,343
Int. Cl.³ A01M *23/00*
U.S. Cl. 43—96 **3 Claims**

1. A pole-mounted bait and trap attachment adapted for use in combination with traps for fur-bearing water animals, comprising an attachment member having a bait holding portion, a trap holding portion and a pole encircling portion which said portions are formed from one-piece rod stock and rigidly interconnected as an integral unit, said bait holding portion comprising a spear member projecting upwardly above said pole encircling portion and said trap holding portion being positioned below said bait holding portion and comprising hook means adapted to hold an animal trap in suspended, depending relation therefrom, said pole encircling portion being convoluted and forming ring means comprising a pair of continuously and helically formed rings rigidly joined together in abutting relation on one side for single pole engaging contact and said rings diverging away from each other from said one side into spaced relation on the opposite side to form vertically spaced-apart, dual pole engaging contacts, said ring means being adapted to be positioned in circumscribing relation around a pole-stake with said single contact and dual contacts of said ring means being engaged on opposite sides of said pole-stake, said bait and trap holding portions being substantially vertically aligned on said single contact side of said ring means, and pole securing means attached to said dual contact side of said ring means and being adapted for releasably and adjustably securing said attachment member to the pole-stake.



4,502,243

INSECT HAMMER

Carl A. Spindler, 31943 W. 13 Mile Rd., Farmington Hills, Mich. 48018, assignor to Carl Spindler

Filed Mar. 17, 1983, Ser. No. 459,810
Int. Cl.³ A01M *3/02*
U.S. Cl. 43—137 **1 Claim**

1. An insect hammer device comprising: a head having a hollow base and means to impale, kill, and trap an insect; with a handle connected to said head; said base being of relatively thin firm material in a spherical configuration and supporting said means, said means comprising projections; said projections tapering radially from the base towards a rounded end of each projection, and each projection being of equal length and spacing from every other projection to thereby form a lifting surface to impale, kill, and trap an insect by forcing the insect past said rounded tips into a wedged position between said projections; and all of said projections having substantially the same configuration to permit easy removal of the trapped insect by tapping the handle against an object.

4,502,244

LANDSCAPE DEVICE FOR TREES

Kevin P. Yoham, 6901 SW. 72nd Ct., Miami, Fla. 33143

Filed Oct. 13, 1983, Ser. No. 541,458
Int. Cl.³ A01G *17/00*
U.S. Cl. 47—25 **7 Claims**

1. A device to be positioned at the base of a tree in surrounding relation thereto, said device comprising:

(a) a receptacle means including a floor extending from a first central opening in adjacent, surrounding relation to the tree, radially and outwardly therefrom to an outer peripheral portion of said receptacle means,

(b) a tray means disposed above and in spaced relation to said receptacle means, said tray means including an upper floor extending radially and outwardly from a second central opening formed in said upper floor to an outer peripheral portion of said tray means, said outer peripheral portion of said tray means being disposed in inwardly spaced relation from said outer peripheral portion of said receptacle means,

(c) said second central opening disposed in adjacent, surrounding relation to the tree and in coaxial relation to said first central opening,

(d) a peripheral channel having an annular configuration and disposed between and at least partially defined by said respective peripheral portions of said receptacle means and said tray means in communicating relation to said receptacle floor,

(e) web means disposed within said peripheral channel in attached interconnecting relation between said respective peripheral portions, said web means structured and disposed to supportingly position said tray means in spaced relation to said receptacle means;

(f) a first radial slit and a second radial slit formed respectively in said receptacle floor and said upper floor and each extending radially and outwardly from said first central opening and said second central opening through said respective peripheral portions, and

(g) whereby said device can be opened for placement relative to the tree.

4,502,245

MEANS FOR CONTROLLING PIVOTAL DOORS IN NUCLEAR PLANTS

Friedrich Krieger, Würzburg, and Norbert Klemm, Giebelstadt, both of Fed. Rep. of Germany, assignors to Gg. Noell GmbH, Würzburg, Fed. Rep. of Germany

Filed May 18, 1981, Ser. No. 264,890
Int. Cl.³ E05D *15/50*
U.S. Cl. 49—193 **10 Claims**

1. A pivotal door for alternatively closing and opening a pair of oppositely disposed door openings in basins for storing fuel elements in nuclear plants, comprising

a pair of oppositely disposed door openings;

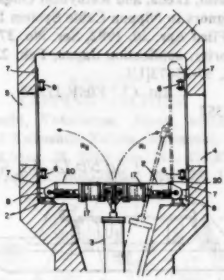
a rectangular panel adapted to selectively close one and leave open the other of said pair of oppositely disposed door openings and provided with wide surface sides and narrow edge sides;

a pair of fluid operated cylinder-piston motors supported by said panel and arranged on said panel in such a way that the direction of operation of said pair of cylinder-piston motors is parallel to one of said narrow edge sides of said panel;

a pair of plates pivotally mounted on the rectangular panel each arranged to be pivoted by one of said pair of cylinder-piston motors, said pair of plates each comprising a first arm and said pair of plates each comprising a second arm angularly displaced from said first arm so that when said first arms are raised or, respectively, lowered said second arms are lowered or, respectively, raised;

two first rods extending parallel to the general plane of said panel and pivotally supported by each respective first arm and having two limiting positions;

a pair of abutment means affixed to the stationary structure defining a respective door opening and cooperating with each first rod for selectively enabling said panel to pivot and disabling said panel from pivoting around one of the narrow edge sides thereof;



fixed latching means disposed adjacent to each of said door openings and affixed to the stationary structure defining each of said pair of door openings;

two second rods extending parallel to the general plane of said panel and pivotally supported by a corresponding second arm and having two limit positions; and

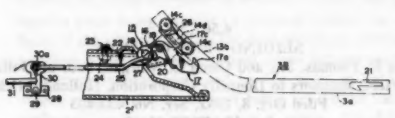
two movable latching means each provided to a corresponding second rod and capable of cooperating with said fixed latching means for selectively enabling and disabling said fixed latching means and said movable latching means to engage each other.

4,502,246

DEVICE FOR CATCHING A FULLY OPENED SLIDE DOOR

Tatsuo Minami, Isehara, Japan, assignor to Nissan Shatai Co., Ltd., Kanagawa, Japan

Filed Mar. 14, 1983, Ser. No. 475,248
Claims priority, application Japan, Jun. 29, 1982, 57-96764[U]
Int. Cl.³ E05D *17/00*
U.S. Cl. 49—322 **11 Claims**



1. A device for catching a fully opened sliding door of a vehicle, comprising:

a guide rail fixed to a vehicle body;

a bracket pivoted to a door panel and moveable along the guide rail;

a catch lever provided with a hooked portion at its free end and biased by a spring, said spring forcing said hooked portion toward the guide rail, said catch lever being pivoted to the bracket at the other end by a pivot pin;

catch means provided on the guide rail for engaging said catch lever;

stopper means provided on the bracket for limiting the range of possible swinging motion of the catch lever;

said door panel being slidable along the side of the vehicle body as the bracket moves along the guide rail, the catch means being positioned so that the catch means becomes

engaged with said hooked portion of the catch lever when the bracket has reached the position corresponding to the fully opened position of the door panel;

said catch lever having a protrusion located between the hooked portion and the pivot pin, and said protrusion contacting said stopper means.

4,502,247

GUIDE RAIL FOR A WINDOW REGULATOR AND SLIDE GUIDE MECHANISM EMPLOYING THE SAME

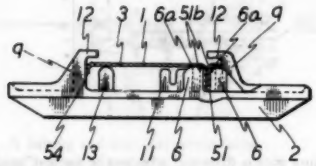
Tetuo Kobayashi, Ikeda, and Katuyoshi Ohgaki, Osaka, both of Japan, assignors to Nippon Cable System Inc., Hyogo, Japan

Filed Apr. 20, 1982, Ser. No. 370,047

Claims priority, application Japan, Feb. 23, 1982, 57-28676; Feb. 23, 1982, 57-25473[U]

Int. Cl.³ E05F *11/48*

U.S. Cl. 49—352 **6 Claims**



3. A slide-guide mechanism for guiding a window glass of window regulator, comprising

(A) a guide rail which is formed out of a hoop sheet, having a double bending portion which is raised at almost right angle with said hoop sheet and in the longitudinal direction of said hoop sheet; and

(B) a bracket which is secured to the window glass and is slidably guided along said guide rail by driving of a wire, having

slide shoes arranged alternatingly along said double-bending portion of guide rail, and provided with an oil groove on a side face coming into contact with said double-bending portion;

at least two guide shoes provided in relation to both side edges of said guide rail, and having a face for guiding both side margins secondary; and

a fitting member for securing a wire extending in longitudinal direction of said guide rail.

4,502,248

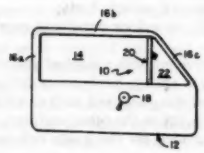
SLIDING VENT WINDOW

John F. Thomas, Jr., and Cleon C. Morgan, both of Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.

Filed Oct. 8, 1982, Ser. No. 433,403

Int. Cl.³ E05F *11/38*

U.S. Cl. 49—374 **36 Claims**



1. A sliding panel assembly for a vehicle comprising:

a panel including an edge;

an elongated molded guide member bonded directly to said panel edge, said guide member extending generally the full length of said panel edge and being generally uniform in cross section throughout its length; and

a pillar to be supported by the vehicle, said pillar defining a channel having a restricted opening, said guide member being slidably received within said channel for axial movement therein, said guide member including a weather shield positioned within said channel, said weather shield being wider than said restricted opening whereby said guide member and said pillar cooperate to permit said guide member to slide axially within said pillar and to prevent said guide member from significantly shifting transversely of said pillar, the length of said guide member facilitating ease of movement within said channel so that said panel travels in a predetermined path as said guide member slides within said pillar channel, and further whereby said guide member and said channel cooperate to form a substantially weatherproof seal extending generally the length of said panel edge.

4,502,249

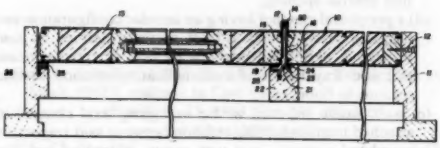
DOORWAY STRUCTURE

Dennis W. Banford, Evans, Ga., assignor to Peachtree Doors, Inc., Norcross, Ga.

Filed Aug. 2, 1983, Ser. No. 519,498

Int. Cl.³ E05D *15/00*; E06B *3/34*

U.S. Cl. 49—381 **6 Claims**



1. A doorway structure comprising a frame, at least one fixed doorway panel in said frame, a plurality of spaced fastener elements penetrating said fixed panel at its top, bottom and along one vertical edge and anchoring it within said frame, a horizontally swinging door, spaced hinges mounting said door to the other vertical edge of the fixed panel, each hinge including a leaf attached to a vertical edge of the swinging door and another leaf attached to said other vertical edge of the fixed panel, a lateral flange carried by the last-named hinge leaf, and additional fastener elements anchoring said flange to an adjacent stationary structural member of the doorway structure, thereby tying said structural member through the hinge to said fixed panel while rigidifying the mounting of said swinging door.

4,502,250

GRINDING APPARATUS

James A. Delso, Alsip, Ill., assignor to 3-D Enterprises, Inc., Alsip, Ill.

Filed Sep. 13, 1982, Ser. No. 416,989

Int. Cl.³ B24B *5/38*

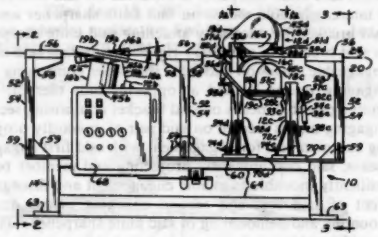
U.S. Cl. 51—80 A **7 Claims**

1. A grinding machine for continuous removal of scale or the like from an exterior surface of an elongated metal workpiece such as a wire or rod which is continuously transported through the machine, the machine comprising:

a frame for the machine,

grinding wheels having concave grooves extending around their peripheral surfaces, at least two opposed pairs of grinding wheels being positioned to engage the wire, the grinding wheels in each pair being disposed on opposite sides of the workpiece and engaging each other to be

self-dressing with wear of the grinding wheels, said grinding wheels being made of resilient abrasive material having open pores and having grooved peripheral surfaces wrapped around intersecting circumferential portions of the traveling work surface as they rotate,



the grinding wheels being uniformly canted at an angle of between 5° and 15° with respect to the direction of travel of the workpiece,

means for mounting the grinding wheels on the frame, and motor means for rotating the grianding wheels about their axes.

4,502,251

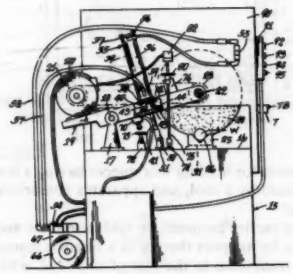
CUT-OFF SAWS

William C. Everett, Warren, Ohio, assignor to Charles T. Everett, Warren, Ohio

Continuation of Ser. No. 292,598, Aug. 13, 1981, abandoned. This application Feb. 28, 1984, Ser. No. 582,874

Int. Cl.³ B24B *27/06*

U.S. Cl. 51—99 **2 Claims**



1. Apparatus for severing work, comprising a housing having a supporting surface, a rocker arm pivotally mounted intermediate its ends on said supporting surface for rocking upward and downward movement in a vertical direction through a stroke adapted to accommodate work of a predetermined maximum thickness and work of a lesser thickness, a motor supported on one arm portion of said rocker arm and a disc-like cutter rotatably mounted on the other arm portion of said rocker arm and having connection with said motor so as to be rapidly rotated thereby, and a vise for clamping the work in a horizontal position whereby said cutter engages and cuts through the work in its downward movement and is thereafter returned to an upward position free of the work,

the improvement comprising:

a control system including means activated when said cutter has cut through the work to cause said cutter to move upwardly, and means to cause said cutter to move upwardly at a constant rate throughout the upward movement, and

a timer including manually adjustable time settable means to specify a predetermined duration of time operation, and means for commencing timer operation when said cutter begins it upward movement, the predetermined duration of the timer operation being correlated with the constant rate of upward movement of said cutter and with the thickness of the work being cut to time out and interrupt further upward movement of said cutter at a point just shortly after the latter leaves the cut at the upper surface of the work thereby to position said cutter closely adjacent the upper surface of the work for subsequent downward movement in a succeeding cutting operation.

4,502,252

LAPPING MACHINE

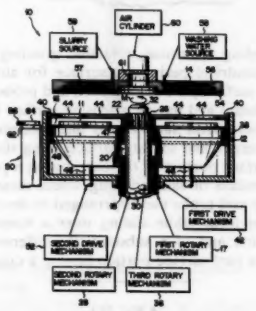
Masaburo Iwabuchi, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Mar. 28, 1983, Ser. No. 479,471

Claims priority, application Japan, Mar. 29, 1982, 57-50819

Int. Cl.³ B24B *5/00*

U.S. Cl. 51—118 **12 Claims**



1. An apparatus for simultaneously polishing and lapping opposing faces of each of a plurality of objects, comprising:

a. a rotatable lower lapping plate having a carrying surface for carrying the objects, the carrying surface having a first polishing member for polishing and lapping one face of each object;

b. a rotatable upper lapping plate having a second polishing member to polish the other face of each object, the upper lapping plate being capable of abutting against the other faces of the objects laid on the first polishing member;

c. a carrier positioned between said upper lapping plate and said lower lapping plate and having holes to hold each object, said carrier capable of being set on the carrying surface of the lower lapping plate to retain each object on the carrying surface during polishing and lapping;

d. washing water supply means for supplying washing water between the upper lapping plate and the lower lapping plate to clean the objects on the lower lapping plate after polishing and lapping said objects;

e. a carrier transfer means for lifting up the carrier from the carrying surface after polishing and lapping, leaving the objects lying on the carrying surface;

f. collecting means adjacent said lower lapping plate and including a first sweeper and a second sweeper, said first sweeper being movable in a first direction to arrange the objects remaining on the carrying surface in a line, and said second sweeper being movable in a second direction substantially parallel to said line of objects to move said objects toward one end of said line; and

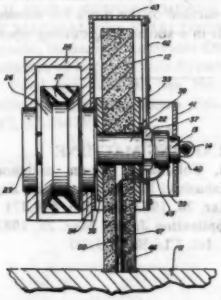
g. a cassette positioned at the one end of said line to receive the objects being moved by said second sweeper.

4,502,253

SURFACE TREATING AND TESTING APPARATUS

Donald E. Lorenzi, and Helmut F. Wagerer, both of Des Plaines, Ill., assignors to Magnaflux Corporation, Chicago, Ill.

Filed Aug. 12, 1982, Ser. No. 407,656
Int. Cl.³ B24B 49/10
U.S. Cl. 51—165 R 12 Claims



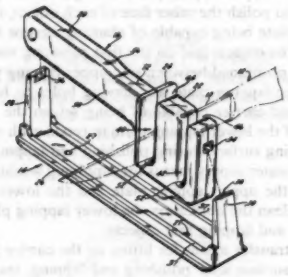
1. In grinding apparatus, rotatable grinding wheel means having a cylindrical peripheral surface for abrasive engagement with a surface portion of a part, and probe means within said wheel means and having a sensing surface flush with said cylindrical peripheral surface and intermediate the opposite axial ends thereof, and sensing surface being slidably engaged with said surface portion of the part during a portion of each complete rotation of said grinding wheel means, and means connected to said probe means arranged to develop an output signal of one form while sliding over a homogeneous part surface portion and of a substantially different form while sliding over a part surface portion having a crack therein.

4,502,254

KNIFE SHARPENER AND MOUNTING BRACKET THEREFOR

Larry D. Carter, Mosinee, Wis., assignor to Oy Fiskars AB, Helsinki, Finland

Filed Dec. 29, 1982, Ser. No. 454,498
Int. Cl.³ B24D 15/08
U.S. Cl. 51—214 5 Claims



1. In combination:

a knife sharpener comprising a handle, an end portion connected to said handle and blade sharpening means on said end portion, said knife sharpener having opposite ends and said end portion having opposite sides;

a one-piece molded plastic storage and mounting bracket on which said knife sharpener is releasably mountable and comprising means for securing said bracket to a supporting object, said bracket comprising a base portion, a pair of upwardly projecting end members at opposite ends of said base portion, at least one of said end members being resiliently movable, and a pair of upwardly projecting side members at opposite sides of said base portion for receiving said end portion of said knife sharpener therebetween when said knife sharpener is mounted on said bracket;

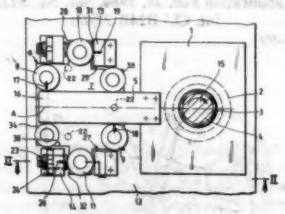
and interengageable means on said knife sharpener and on said bracket for releasably attaching said knife sharpener to said bracket in stationary rigid relationship, said interengageable means on said knife sharpener comprising first engaging means located at opposite ends thereof, said interengageable means on said bracket comprising second engaging means located on said pair of upwardly projecting end members for engagement with said first engaging means, said one upwardly projecting end member being resiliently movable to enable engagement and disengagement of said first and second engaging means during mounting and demounting of said knife sharpener relative to said bracket.

4,502,255

APPARATUS FOR HOLDING WORKPIECES

Albert Bender, Ostfildern, Fed. Rep. of Germany, assignor to Maschinenfabrik Gehring Gesellschaft mit beschränkter Haftung & Co. Kommanditgesellschaft, Ostfildern, Fed. Rep. of Germany

Filed Jun. 21, 1982, Ser. No. 390,675
Claims priority, application Fed. Rep. of Germany, Jun. 26, 1981, 3125188
Int. Cl.³ B24B 19/00
U.S. Cl. 51—227 R 20 Claims



1. An apparatus for holding workpieces having a bore which is to be machined by a tool, said apparatus comprising:

a base plate;

a workpiece carrier mounted on said base plate and including means for support thereof in a floating manner freely movable transverse to the axis of said tool, with at least one workpiece being held on said workpiece carrier; and

an arresting device including means for connection thereof relative to said base plate for securing said workpiece carrier against rotation;

a force-absorbing part included with said arresting device, said force-absorbing part being movable relative to said base plate and said workpiece carrier; and

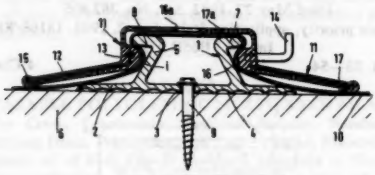
holding means for keeping said force-absorbing part non-rotatable relative to said base plate, said holding means also including abutment means absorbing force acting on said arresting device from said workpiece carrier while machining forces are transferred relative to said base plate said abutment means comprising a first abutment piece and a second abutment piece, said workpiece carrier being a plate having an abutment part in the form of an arm which projects at least partially between said first and second abutment pieces; said first and second abutment pieces being arranged in such a way that said second abutment piece forms a counter force for a reaction force generated from said first abutment piece during abutment of said arm there against with said reaction force being equal and opposite to said counter force.

4,502,256

ARRANGEMENT FOR SECURING A FLEXIBLE WEB TO A WALLING MEANS

Ralf Hahn, Michelstadt/Odenwald, Fed. Rep. of Germany, assignor to Veith Pirelli, A.G., Hochst/Odenwald, Fed. Rep. of Germany

Filed Jan. 15, 1982, Ser. No. 339,614
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1981, 3102201; Apr. 9, 1981, 3134973
Int. Cl.³ E04B 1/12
U.S. Cl. 52—63 13 Claims



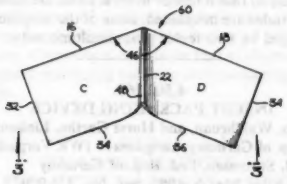
1. An arrangement for securing a water-impervious, flexible web comprising an elastomer on a walling means to be sealed, in particular a flat roof, comprising a holder member which can be secured to the walling means and which has a projection with an outwardly projecting side bead forming an undercut configuration, and an outer securing member, wherein the web can be clamped fast between the holder member and the outer securing member, characterised in that the outer securing member has as one piece a plate-shaped resilient spring plate which is at least partially encased by an elastomer or plastomer material and a clamp means which is enclosed on all sides by an elastomer or plastomer material, forming a resiliently yielding cushion means arranged in relation to the flexible web.

4,502,257

STRUCTURAL MODULES

Gary Diamond, 3525 Sawtelle #101, Los Angeles, Calif. 90066

Filed Feb. 2, 1981, Ser. No. 230,899
Int. Cl.³ E04B 1/32
U.S. Cl. 52—80 18 Claims



1. A complex, substantially polyhedral, three-dimensional space enclosing module for forming in conjunction with other similar modules, space enclosing structures and space enclosing structural frameworks, the module comprising:

a structure defined by four surfaces with each surface being bounded by four edges;

two of such edges being straight and forming a right angle and defining a plane;

a third of said four edges also being straight and intersecting said plane;

said third edge being connected to a first of said two straight edges by a curved fourth edge thereby closing the surface;

said four surfaces being joined in pairs along at least one of said two straight edges; and

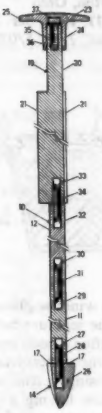
said pairs being joined together along the respective pairs of said third edges.

4,502,258

DRIVEN-TYPE SECTIONALIZED SURVEY MONUMENT RESISTANT TO REMOVAL

William C. Rushing, Madison, Wis., assignor to Berntsen, Inc., Madison, Wis.

Continuation of Ser. No. 253,056, Apr. 10, 1981, abandoned.
This application Sep. 21, 1983, Ser. No. 534,414
Int. Cl.³ E04F 9/02
U.S. Cl. 52—103 8 Claims



1. A sectionalized driven-type survey monument resistant to removal, comprising:

(a) at least one cylindrical rod section of uniform cross-section, each such rod section having threaded bores formed in its top and bottom ends and flat surfaces on the ends surrounding the bores;

(b) a penetrating point section attached to the lower end of an adjacent cylindrical rod section and having at least two generally longitudinal barbs radially spaced on the periphery of the penetrating point section, each of the barbs having a biased turning surface thereon to cause rotation of the point section as it is driven into the ground, the upper end of the penetrating point section having a threaded bore formed therein adapted to mate with the threaded bore formed in the lower end of the adjacent cylindrical rod section and a flat end surface surrounding the bore;

(c) a rotation resistant anti-twist rod section having an elongated cylindrical body and straight fins formed integrally with and extending outwardly from the cylindrical body over a portion of the length of the cylindrical body and terminating at a position spaced downwardly from the top end of the cylindrical body such that the uniform cylindrical body extends from the top edges of the fins to the top end of the anti-twist rod section whereby a survey marker cap can be placed over the top end without interference by the fins, the lower end of the cylindrical body having a threaded bore formed therein adapted to mate with the threaded bore of the upper end of the adjacent cylindrical rod section and a flat end surface surrounding the bore; and

(d) threaded connectors seated in the bores in the ends of the penetrating point section, cylindrical rod section and the anti-twist rod section and connecting them in a series so that the surfaces of the upper end of the penetrating point section and the lower end of the adjacent cylindrical rod section and the surfaces of the lower end of the anti-twist

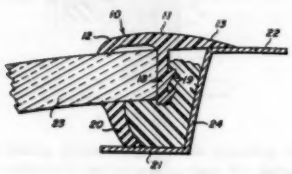
rod section and the upper end of the adjacent cylindrical rod section are in engagement, whereby the driving of the penetrating point section into the ground will cause it to exert a torque on the adjacent cylindrical rod section which will be transmitted to and resisted by the fins on the anti-twist rod section as the fins enter into the ground so as to cause the connections between all sections to be tightened.

4,502,259

TRIM STRIP WITH POSITIONING LEG

Donald E. Smith, Englewood, Ohio, assignor to Protective Treatments, Inc., Dayton, Ohio

Filed Jan. 11, 1982, Ser. No. 338,234
Int. Cl.³ E04C *2/38*, *5/07*; E06B *3/62*
U.S. Cl. 52—208 **4 Claims**



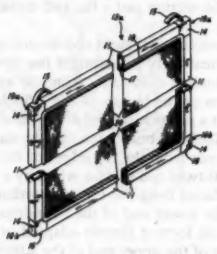
1. A combination of a window glass with a trim strip which is intended to conceal the juncture between the window glass and the panels which define a body opening in a vehicle and a rubber dam adhered to the undersurface of the window glass adjacent its edge comprising, a trim strip formed with an inwardly projecting portion having a lower surface which is adhesively secured to the upper surface of the window glass adjacent its edge, an outwardly projecting portion which is intended to overlie the vehicle body panels adjacent the body opening therein, and a centrally located downwardly projecting positioning leg which bears against the edge of the window glass to correctly position the trim strip with respect to the glass, said positioning leg being formed with one or more protuberances adapted to interlock with a curable sealant.

4,502,260

CORNER FASTENER

David C. Machler, 9815 Sheehan Rd., Centerville, Ohio 45459

Filed Nov. 28, 1983, Ser. No. 555,512
Int. Cl.³ E04C *2/38*
U.S. Cl. 52—656 **15 Claims**



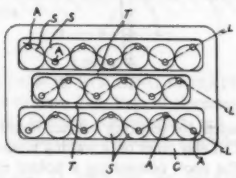
1. A corner fastener for use in forming a frame assembly by interconnecting at a predetermined angle elongated tubular members having a hollow internal space of a predetermined and generally rectangular cross sectional area comprising a pair of legs at such predetermined angle with respect to each other connected to a junction member, each of the legs being adapted for disposition within the interior of the elongated tubular members and being of such a cross sectional area so as to substantially and securely fill the internal space of the elongated tubular members, the junction member being of such configuration so as to be contiguous with the outer walls of the tubular members, and the junction member having a resilient finger projecting outwardly and curving medially to effect securement of the frame assembly to a window frame.

4,502,261

FEELER PINS DEVICE FOR CIGARETTE GROUPS

Antonio Zullo, Bologna, Italy, assignor to Sasib S.p.A., Bologna, Italy

Filed May 27, 1982, Ser. No. 382,805
Claims priority, application Italy, Jun. 2, 1981, 15168/81[U]
Int. Cl.³ B65B *57/10*
U.S. Cl. 53—54 **4 Claims**



1. In a feeler device for sensing the number of rod-like articles which have ends and which form an orderly group of articles of more than one row housed in a tubular pocket, the ends of the articles in the group normally being substantially co-planar and having predetermined positions, said feeler device including a feeler head having a plurality of feeler pins which have axes that are parallel to one another and which are slidably mounted so as to move resiliently and axially in said feeler head, said feeler head being softly pushed with its feeder pins in a direction parallel to the axes of said feeler pins against the substantially co-planar ends of the articles so that the feeler pins engaging the ends of corresponding articles will be resiliently displaced in order to detect the absence of an article in the group, the improvement wherein: means for mounting at least some of the feeler pins on said feeler head considerably excentrically with respect to the corresponding predetermined positions of the ends of the articles in the group and at a distance from at least one adjacent pin greater than the diameter of said articles, so that if one or more articles are absent and the remaining articles are misplaced, none of the misplaced articles can be engaged by two feeler pins simultaneously.

4,502,262

INSERT PACKAGING DEVICE

Werner Reim, Waldbronn, and Horst Garthe, Linkenheim, both of Fed. Rep. of Germany, assignors to IWK Verpackungstechnik GmbH, Stutensee, Fed. Rep. of Germany

Filed May 5, 1982, Ser. No. 375,020
Claims priority, application Fed. Rep. of Germany, May 8, 1981, 3118209
Int. Cl.³ B65B *35/54*
U.S. Cl. 53—157 **11 Claims**

1. Apparatus for positioning inserts relative to products on a

product chain prior to packaging said products within respective product containers, said apparatus comprising insert transport belts for conveying said inserts to an insert pincer chain, in a transfer zone in which said inserts are transferred from said transport belts to said pincer chain, said insert pincer chain comprising means for positioning said inserts relative to said products prior to release from said pincer chain, said pincer chain being positioned below said product chain and being directed alongside said product chain in an insertion zone in which said inserts are inserted into product containers, said insert pincer chain being inclined relative to said product chain and being generally positioned such that said insert pincer chain moves beneath said product chain along said insertion zone, wherein said products are inserted into respective product containers.

4,502,263

SEALABLE POLYOLEFINIC MULTILAYER FILM

Günther Crass, Taunusstein; Siegfried Janocha, Wiesbaden; Wolfgang Dietz, Wiesbaden, and Lothar Bothe, Mainz-Gonsenheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 16, 1983, Ser. No. 562,014

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1982, 3247998

Int. Cl.³ B32B *27/32, 31/16;* B65B *11/06*

U.S. Cl. 53—396 **8 Claims**

1. Sealable polyolefinic multilayer film, comprising a base layer comprised of a propylene polymer and at least one sealable layer containing at least one propylene copolymer, at least one low-molecular weight resin and at least one polydiorganosiloxane, wherein the sealing layer comprises a combination of

(a) from about 68.5 to 89.7% by weight, based on the weight of the sealable layer, of an olefin resin composition, comprising an ethylene-propylene-butylene terpolymer and a propylene-butylene copolymer, corresponding to a content of from about 0.1 to 7% by weight of ethylene, 53 to 89.9% by weight of propylene and 10 to 40% by weight of butylene, based on the weight of the olefin resin composition,

(b) from about 5 to 15% by weight, based on the weight of the sealable layer, of a low-molecular weight resin, which is compatible with the olefin resin composition,

(c) from about 5 to 15% by weight, based on the weight of the sealable layer, of a propylene homopolymer, and

(d) from about 0.3 to 1.5% by weight, based on the weight of the sealable layer, of a polydiorganosiloxane.

8. A process for the high-speed packaging of articles, comprising the step of running a multilayer film as claimed in claim 1 in a high-speed packaging machine and packaging an article with said film.

4,502,264

FILM WRAP MACHINE

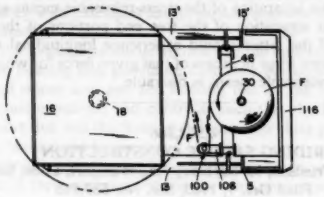
Anthony H. Flaherty, 7365 Thornapple Pines SE., Grand Rapids, Mich. 49506

Filed Feb. 21, 1978, Ser. No. 879,380

Int. Cl.³ B65B *11/04*

U.S. Cl. 53—399 **17 Claims**

1. A method for peripherally stretch-wrapping pallet loads with polymeric film by rotating a load support platform supporting a pallet load and allowing film to unroll from a support spindle whose axis bears a parallel orientation relative to the axis of said load platform, said method including: operably connecting restraining means to said spindle and thereby preventing unrestrained unrolling of film positioned thereon; providing a tension roll free of engagement with any other roll between said spindle and said load platform and locating said tension roll laterally offset from and parallel to said platform and spindle axes; pulling film off said spindle, over said tension roll and around the pallet load, without passing it through any compression rolls, by rotating said load platform; restraining said tension roll and regulating the rate of rotation thereof by



operably connecting tension roll control means thereto to thereby maintain regulated tension on the film being wrapped.

4,502,265

BREAKAWAY SAFETY HALTER

Richard Horrigan, Stormfield, Rte. 107, West Redding, Conn. 06896

Filed Jan. 9, 1984, Ser. No. 569,130

Int. Cl.³ B68B *1/02*

U.S. Cl. 54—24 **5 Claims**

1. A breakaway halter for horses and like animals, comprising in combination:

(a) a nose strap,

(b) a neck strap,

(c) a pair of face straps connecting the nose strap to the neck strap,

(d) said neck strap having a pair of free end portions overlying one another in contiguous juxtaposition,

(e) an elongate, overlapping stress-releasable means on said free end portions of the neck strap, said means having areas disposed broadside to each other, said stress-releasable means securing together said free end portions of the neck strap and being adapted to separate and enable separation of said free end portions when the latter are subjected to a given tensile separating force, and

(f) a manually-releasable positive fastener means comprising a ring permanently and securely attached to one of said free end portions of the neck strap and encircling the said broadside areas of the elongate, overlapping stress-releasable means to facilitate alignment thereof, said stress-releasable means extending through said ring and being operable to hold the halter together without dependence on said ring, and said fastener means being adapted to secure the said free end portions of the neck strap to each other against inadvertent separation,

(g) said manually-releasable positive fastener means nor-

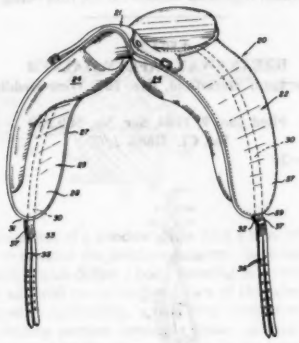
mally applying pressure to the overlapping stress-releasable means to increase the holding power thereof, said positive fastener means over-riding and rendering inoperative the separation of the stress-releasable means so as to prevent separation of the free end portions of the neck strap if the latter should experience longitudinal tensile separating force in excess of that given force for which the stress-releasable means is operable.

4,502,266

RIDING SADDLE CONSTRUCTION

Ronald S. Friedson, 95 Bayberry La., Westport, Conn. 06880

Filed Oct. 7, 1983, Ser. No. 539,843
Int. Cl.³ B68C *1/00*
U.S. Cl. 54—44 **14 Claims**



1. A saddle construction comprising:
A. a centrally disposed tree portion,
B. two side flaps extending from the tree portion,
C. web means securely attached to the side flaps at a plurality of separate positions along the length thereof, preventing independent movement of the entire web means relative to the side flap; and
D. billet straps securely affixed to the terminating ends of the web means
whereby a unique saddle construction is achieved which eliminates the need for seat flaps and long billet straps, as well as the twisting, turning, and wear of the billet straps below the side flap.

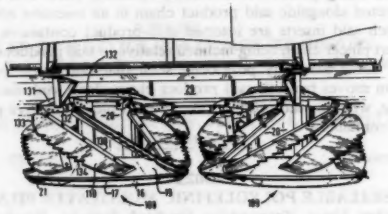
4,502,267

CROP ENGAGING APPARATUS AND METHODS

Wilfred E. Klinner, Milton Keynes, England, assignor to National Research Development Corporation, London, England

PCT No. PCT/GB81/00158, § 371 Date Apr. 9, 1982, § 102(e) Date Apr. 9, 1982, PCT Pub. No. WO82/00564, PCT Pub. Date Mar. 4, 1982
PCT Filed Aug. 6, 1981, Ser. No. 369,013
Claims priority, application United Kingdom, Aug. 14, 1980, 8026481; Aug. 14, 1980, 8026526
Int. Cl.³ A01D *55/18, 82/00*
U.S. Cl. 56—13.6 **23 Claims**

1. Crop engaging apparatus comprising:
a mobile frame for movement over the ground,
at least one crop engaging rotor for conditioning and conveying cut crop, and
drive means for rotating said rotor about a vertical axis, or near vertical axis, for conditioning cut crop and conveying the crop towards the rear of the machine,
the rotor comprising a brush-like structure having a multiplicity of stiff, resilient, outwardly directed, elongate crop engaging elements, crop engaging being arranged in a plurality of part helical arrays distributed around the rotor axis, each said array occupying only part of the circumference of said rotor, and each said array leading upwardly and rearwardly relative to the intended direction of rotation of said rotor so as to exert a lifting action on crop engaged by the rotor,
each said array comprising a lower part close to the ground,



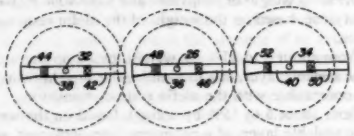
and an upper part which is spaced from the ground, crop engaging protruding outwardly from said rotor axis both at said lower part of said array and at said upper part of said array, the distal ends of crop engaging forming an outer envelope of said rotor over a substantial proportion of the height of said rotor so that said distal ends of crop engaging exert a conditioning action on the crop.

4,502,268

APPARATUS FOR CUTTING UPSTANDING AGRICULTURAL CROPS

John Kulak, Port Colborne, Canada, assignor to Deere & Company, Moline, Ill.

Continuation of Ser. No. 547,539, Oct. 31, 1983, abandoned.
This application Jun. 11, 1984, Ser. No. 618,761
Int. Cl.³ A01D *35/264*
U.S. Cl. 56—13.6 **7 Claims**



1. An apparatus for cutting grass and other upstanding agricultural crops with a plurality of adjacent rotary cutter elements, comprising:
horizontal rotary driving shaft means axially athwart the direction of movement of such apparatus across a field to be cut,
plural means engaged by said driving shaft means to convert the motion of rotation thereof to rotary motion about a vertical axis in a respective vertical shaft engaged thereby at each of said plural means,
means attached to each said vertical shaft for mounting thereon a pair of diametrically opposed cutting blades, the radial dimensions of said mounting means and of said cutting blades being such that the outer tip of the first of the two opposed cutting blades is at a materially greater distance from the center of said vertical shaft than the outer tip of the second said blade, said mounting means and said blades constituting substantially equal masses on the opposed sides of said shaft so as to form a dynamically balanced rotor on said shaft, and
means for mounting adjacent ones of said vertical shafts such that the circle of rotation described by the outer tip of each said first blade overlaps the circle of rotation described by the outer tip of said first blade mounted on each adjacent said shaft while not overlapping the circle of rotation described by the outer tip of said second blade

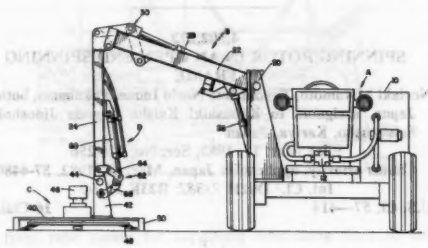
mounted on said adjacent shaft, the relative rotational positions of adjacent ones of said vertical shafts being such that said first blades on adjacent ones of said shafts pass through the area of such overlap substantially 180 degrees out of phase.

4,502,269

HYDRAULIC MOWER HEAD ORIENTING APPARATUS FOR BOOM MOWERS

Jack O. Cartner, 1005 N. 8th St., Cambridge, Ohio 43725

Filed Sep. 10, 1982, Ser. No. 416,596
Int. Cl.³ A01D *35/28*
U.S. Cl. 56—15.5 **2 Claims**



1. A boom mower comprising:

a mowing apparatus including a rapidly rotating member for cutting vegetation, the mowing apparatus including an arm extending rigidly therefrom;

a boom assembly including at least a first boom arm movably interconnectable with a prime mover and a second boom arm having a pivotal interconnected adjacent an outer end thereof with the mowing apparatus arm;

a longitudinally extensible and contractable double-acting hydraulic actuator pivotally connected at a first end with the second boom arm, the hydraulic actuator being disposed exterior of the second boom arm, whereby the second boom arm may have a relatively small internal cross section; and,

a kinematic chain assembly disposed exterior of the second boom arm for converting the longitudinal extension and contraction of the hydraulic actuator into 180° of the mowing apparatus arm rotation, the kinematic chain assembly including:

(i) an L-shaped drive link having a first portion which has a first pivotal connection at one end with the second boom arm and is integrally connected at an elbow region with a second portion that extends away from the hydraulic actuator, a second end of the hydraulic actuator being pivotally connected with the drive link elbow region, the first pivotal connection being disposed closer to the second boom arm outer end than to the drive link elbow region such that drive link second portion is arranged to be disposed closely adjacent to and around the second boom arm outer end, the drive link being rotatable around the first pivotal connection through an arc of generally 90°, the L-shaped drive link being disposed exteriorly of the second boom arm;

(ii) floating link having a first pivotal joint at a first end with the second portion of the drive link and having a second pivotal joint at a second end with the mowing apparatus arm, the floating link being disposed exteriorly of the second boom arm and the mower boom arm and having a concave face facing toward the second boom arm, the floating link being movable along an arcuate path with the concave face moving around and closely adjacent to the second boom arm outer end, the floating link amplifying the movement of the drive link such that 90° of drive link rotation produces substantially 180° of mower apparatus arm rotation, whereby a distance between (1) the pivotal connection between the hydraulic actuator second end and the drive link elbow region and (2) the pivotal joint between the floating link second end and the mower apparatus arm varies with extension and contraction of the hydraulic actuator;

(iii) the L-shape of the drive link and the concave face of the floating link providing clearance between the second boom arm and the floating link as the hydraulic actuator extends and contracts such that the L-shaped drive link and the floating link move in close proximity to the second boom arm;

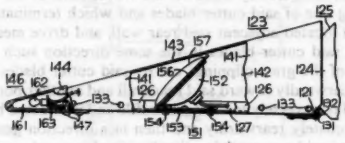
the hydraulic actuator and the kinematic chain selectively control the orientation of the mowing apparatus relative to the second boom arm such that longitudinal motion of said hydraulic actuator rotates the elbow region of said drive link 90° around the pivotal connection between the one end of the drive link and the second boom arm and said floating link second pivotal joint is rotated 180° around the pivotal interconnection between the mowing apparatus and the second boom arm.

4,502,270

CROP DIVIDER WITH ILLUMINATED POINTS

Paul T. Shupert, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Feb. 2, 1984, Ser. No. 576,342
Int. Cl.³ A01D *75/00*
U.S. Cl. 56—314 **7 Claims**



1. In a wheeled agricultural harvester having a crop header at its forward end for crop engaging movement in close proximity to the ground and an operator's station behind said header in elevated relation to the latter, the combination comprising,

a crop divider on and extending forwardly from said header including

a point portion at the forward end of said divider having top and side walls of sheathing tapering forwardly to a tip, a portion of said sheathing being a translucent material which permits passage of light therethrough and is visible to an operator at the operator's station, said point portion being at a level below a major portion of the foliage of the crop being harvested when said harvester is engaged in a harvesting operation, and

an illumination device mounted on said point portion beneath said sheathing and positioned to direct light outwardly through said translucent material, whereby said foliage and adjacent ground area is illuminated thereby aiding said operator in steering said harvester, in maintaining the proper operating height of said header and in seeing foreign objects prior to engagement thereof by said header.

4,502,271

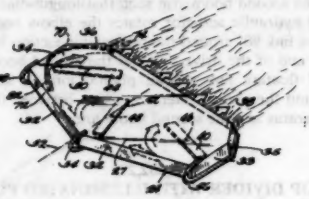
REAR DISCHARGE MULTI-BLADE ROTARY MOWER

Loren F. Hansen, and John E. Hicks, both of Lincoln, Nebr., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 462,036, Jan. 28, 1983, abandoned. This application Mar. 15, 1984, Ser. No. 589,843
Int. Cl.³ A01D *35/264, 35/12*
U.S. Cl. 56—320.1 **9 Claims**

1. A rotary mower comprising a blade housing supported on wheels for travel along the ground and including a top deck, a

front wall depending from said top deck, opposed side walls depending from said top deck and having respective rear portions and being adapted to substantially prevent side discharge of grass clippings, and a substantially continuous rear wall depending from said top deck and extending transversely between the rear end portions of said side walls, means extending transversely generally coextensively with said rear wall and extending downwardly to engage the mowed grass and form an air seal substantially across the rear of said blade housing, a plurality of cutter blades mounted inside said blade housing for rotary movement about laterally spaced vertical axes, an arcuate baffle disposed inside said blade housing and



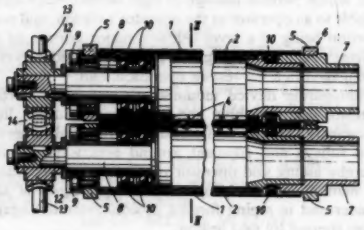
extending from the vicinity of said front wall to said rear wall near one of said side walls, said baffle having a forward end located adjacent said front wall and having a rear portion which extends closely adjacent the travel path of the corresponding one of said cutter blades and which terminates in a rear end located adjacent said rear wall, and drive means for rotating said cutter blades in the same direction such that a portion of the grass clippings cut by said cutter blades is impelled rearwardly toward said rear wall and another portion is impelled transversely toward said baffle and is directed by said baffle arcuately rearwardly and then in a direction generally parallel to said rear wall for distribution along said rear wall.

4,502,272

APPARATUS FOR MAKING A YARN

Helmut Fuchs, Linz, Austria, assignor to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria

Filed Nov. 22, 1983, Ser. No. 554,213
Claims priority, application Austria, Dec. 3, 1982, 4394/82
Int. Cl.³ D01H 7/882
U.S. Cl. 57—401 **2 Claims**



1. In apparatus for making a yarn, comprising

two air-permeable, juxtaposed, closely spaced apart suction drums, which have parallel axes and define between them a generally triangular space and are mounted for rotation about said axes, and

two suction inserts, each of which is contained in one of said suction drums and has a suction slot, which extends generally along said axes and faces said generally triangular space,

each of said suction drums being mounted to be rotatable about its axis relative to the associated suction insert,

the improvement residing in that

each of said suction inserts is mounted to be rotatable about the axis of the associated suction drum for an adjustment of said suction slot relative to said generally triangular space,

positioning drive means are provided for rotating said suction inserts in mutually opposite senses about the axes of the respective suction drums, and

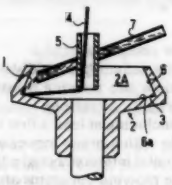
said positioning drive means comprise two stub shafts, each of which is secured to one of said suction inserts and protrudes coaxially from the associated suction drum, two worm gears, each of which is secured to one of said stub shafts, and two worm-carrying shafts, each of which is in mesh with one of said worm gears.

4,502,273

SPINNING ROTOR IN AN OPEN-END SPINNING FRAME

Noriaki Miyamoto, Toyota, and Norio Inoue, Takahama, both of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Mar. 17, 1983, Ser. No. 476,256
Claims priority, application Japan, Mar. 20, 1982, 57-44804
Int. Cl.³ D01H 7/882; B23K 27/00
U.S. Cl. 57—414 **16 Claims**



1. A spinning rotor made of steel material for an open-end spinning frame comprising a rotor body having interior surfaces defining a circular spinning chamber of said rotor including a peripherally extending fiber-collecting groove formed by said surfaces along the region of maximum diameter within said spinning chamber, said steel material containing less than 0.5 percent carbon, and only selected portions of said interior surfaces, including at least those portions thereof which form said fiber-collecting groove, being surface-hardened by heat treatment using a beam of high energy radiation applied substantially momentarily to said selected surface portions.

4,502,274

LUBRICATING AND COOLING SYSTEM FOR INTERSHAFT BEARING OF TURBOJET

Daniel G. Girault, Melun, France, assignor to S.N.E.C.M.A., Paris, France

Filed Mar. 24, 1983, Ser. No. 478,362
Claims priority, application France, Mar. 26, 1982, 82 05598
Int. Cl.³ F02C 7/06
U.S. Cl. 60—39.08 **8 Claims**

1. In a turbojet having inner and outer concentric hollow shafts rotatable about an axis of rotation in a first direction, and at least one bearing positioned between said shafts for permitting relative rotation between said shafts, a system for lubricating and cooling said at least one bearing, said system comprising:

a first ring having a radially inner portion mounted on a radially outer surface of said inner shaft and being positioned upstream of said at least one bearing relative to the direction of flow of air through said turbojet;

a plurality of circumferentially spaced cells in said first ring, each of said cells being open at the upstream end of said first ring and having lengths extending into said first ring;

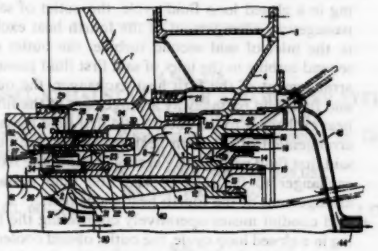
an atomizing orifice extending between the downstream end

of each said cell and the downstream end of said first ring, each said orifice being directed toward said at least one bearing;

a first radial bore for each of said cells, each said first bore extending through said inner portion of said first ring to one of said cells;

a second radial bore in said inner shaft for each said first bore, each said second bore being coaxial with one of said first bores;

an annular groove on an inner wall of said inner shaft, each of said second bores opening into said groove;



fixed tube means for supplying lubricating fluid to said groove; and

means for supplying pressurized air to said upstream end of said first ring,

whereby lubricating fluid is supplied to said cells via said groove and coaxial bores, said lubricating fluid mixing with said pressurized air in said cells and being atomized in said orifice and discharged towards said at least one bearing.

4,502,275

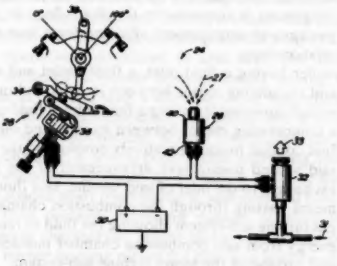
COMPRESSOR AIR BLEED OVERRIDE CONTROL SYSTEM

David J. Petro, Milford, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Oct. 13, 1983, Ser. No. 541,226

Int. Cl.³ F02C *9/18, 9/52*

U.S. Cl. 60—39.27 **10 Claims**



1. In an aircraft turbine engine having a multistage compressor, at least one bleed valve for bleeding air from the compressor in accordance with a schedule of engine control operating conditions, and a power lever for controlling fuel flow and compressor speed, a compressor air bleed override control system for preventing compressor surge, said override control system comprising:

override valve control means for rapidly opening the bleed valve;

power lever sensing means in communication with said power lever and said override valve control means for sensing power lever parameters that are anticipative of compressor surge and causing said override valve control means to open said bleed valve in response to said parameters; and

altitude pressure sensing means in communication with said override valve control means and said power lever sensing means for sensing altitude and preventing said override valve control means from opening said bleed valve below a preselected altitude, whereby when the aircraft turbine engine is above the preselected altitude the power lever sensing means senses power lever parameters that are anticipative of compressor surge and causes the override valve control means to rapidly open the bleed valve to release air from the compressor and prevent compressor surge.

4,502,276

CASING STRUCTURE FOR A GAS TURBINE ENGINE

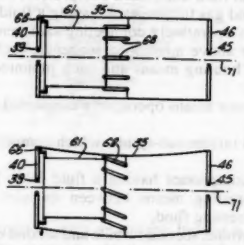
George Pask, Stanton-by-Bridge, England, assignor to Rolls-Royce Limited, London, England

Continuation-in-part of Ser. No. 308,193, Sep. 18, 1981, abandoned. This application Mar. 9, 1984, Ser. No. 588,136

Claims priority, application United Kingdom, Oct. 21, 1980, 8033849

Int. Cl.³ F02C *7/20*; F01D *25/24*

U.S. Cl. 60—39.32 **7 Claims**



1. A casing structure for a gas turbine engine comprising:

a load bearing outer casing;

a forward bearing panel supported from a forward end of said outer casing, said forward bearing panel carrying a forward rotor bearing;

a rearward bearing panel supported from said outer casing, said rearward bearing panel carrying a rearward rotor bearing, said forward rotor bearing and said rearward rotor bearing being coaxial;

an inner casing mounted within said outer casing;

forward support means for maintaining a forward portion of said inner casing substantially concentric with said forward rotor bearing;

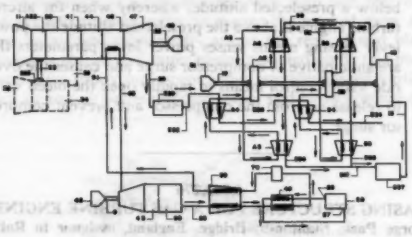
and rearward support means supporting a rearward portion of said inner casing from said outer casing, said rearward support means comprising a parallel motion linkage interconnecting the rearward portion of said inner casing and a section of said outer casing located intermediate said forward bearing panel and said rearward bearing panel at a location of said outer casing having a movable axis which remains parallel with an axis of said forward bearing and said rearward bearing when said outer casing is otherwise distorted in bending due to applied loads, said parallel motion linkage including a plurality of parallel axially extending links movable parallel to each other in both radial and tangential directions to allow a degree of radial displacement between said inner casing and said section of said outer casing to maintain an axis of said inner casing parallel to said movable axis of said section of said outer casing.

4,502,277

TURBINE POWER PLANT SYSTEM

Demos Papastavros, 2429 NE. 184th Ter., North Miami Beach, Fla. 33160

Filed Jan. 25, 1984, Ser. No. 573,703
Int. Cl.³ F02C 6/18
U.S. Cl. 60—39.181 4 Claims



1. In a turbine power plant system having a gas turbine sub-system, exhaust turbine sub-system and steam turbine sub-system;

a gas turbine sub-system which comprises the combination of:

a first compressor, first fluid duct, second compressor, second fluid duct, third compressor, combustion chamber and gas turbine each having a fluid inlet and outlet means operatively connecting said items to each other in the above mentioned sequence, each located in the same housing means and each mounted on a common shaft;

a generator means operatively connected to said common shaft;

an exhaust turbine sub-system which comprises the combination of:

a first compressor having a fluid inlet, fluid outlet and compressing means between its inlet and outlet for compressing fluid;

a first turbine, second turbine and second compressor each having a fluid inlet and outlet and each mounted on a common shaft;

a generator means operatively connected to said common shaft;

a first, second, third, fourth, fifth, and sixth heat exchanger each having a first fluid passageway arrangement having a fluid inlet and outlet at opposite ends and a second passageway arrangement having a fluid inlet and outlet at opposite ends, wherein the fluid flow in said second passageway arrangement is opposite to the fluid flow in said first fluid passageway arrangement allowing for a heat exchange relationship;

a cooler having a fluid inlet, fluid outlet, and cooling means between its inlet and outlet for cooling and circulating fluid;

a fluid conduit means operatively connecting the outlet of said turbine of the gas turbine sub-system to the inlet of said first compressor of the exhaust turbine sub-system, said fluid conduit means receiving hot exhaust fluid from the gas turbine sub-system which provides heat energy to drive the said first turbine and second turbine of the exhaust turbine sub-system;

a fluid conduit means operatively connecting the outlet of said first compressor to the inlet of said second passageway arrangement of the first heat exchanger;

a fluid conduit means operatively connecting the outlet of said second passageway arrangement of the first heat exchanger to the inlet of the second passageway arrangement of the fourth heat exchanger;

a fluid conduit means allowing the fluid flowing from the outlet of said second passageway arrangement of the fourth heat exchanger to be released into the atmosphere;

a fluid conduit means operatively connecting the following in a closed loop fluid cycle, the outlet of the said first passageway arrangement of the first heat exchanger to the inlet of the of said first turbine, the outlet of said first turbine to the inlet of said first passageway arrangement of the second heat exchanger, the outlet of said first passageway arrangement of the second heat exchanger to the inlet of the first passageway arrangement of the third heat exchanger, the outlet of the first passageway arrangement of the third heat exchanger to the inlet of said first passageway arrangement of the first heat exchanger;

a fluid conduit means operatively connecting the following in a closed loop fluid cycle, the outlet of said first passageway arrangement of the fourth heat exchanger to the inlet of said second turbine, the outlet of said second turbine to the inlet of said first fluid passageway arrangement of the fifth heat exchanger, the outlet of said first fluid passageway arrangement of the fifth heat heat exchanger to the inlet of said first fluid passageway arrangement of the sixth heat exchanger, the outlet of said first fluid passageway arrangement of the sixth heat exchanger to the inlet of said first fluid passageway arrangement of the fourth heat exchanger;

a fluid conduit means operatively connecting the following in a closed loop cycle, the outlet of said cooler to the inlet of said second compressor, the outlet of said second compressor to the inlet of said second passageway arrangement of the second and fifth heat exchangers, the outlet of the second and fifth heat exchangers to the inlet of said second passageway arrangement of the third and sixth heat exchangers, the outlet of said second passageway arrangement of the third and sixth heat exchangers to the inlet of said cooler;

a steam turbine sub-system which comprises the combination of;

a turbine, fluid duct and first compressor each having a fluid inlet and outlet means operatively connecting said items in the above mentioned sequence, each located in the same housing means and each mounted on a common shaft;

a generator means operatively connected to said common shaft;

a first and second heat exchanger each having a first fluid passageway arrangement having a fluid inlet and outlet at opposite ends and a second fluid passageway arrangement having a fluid inlet and outlet at opposite ends, wherein the fluid flow in said second passageway arrangement is opposite to the fluid flow in said first passageway arrangement allowing for a heat exchange relationship;

a cooler having a fluid inlet, a fluid outlet and a cooling and circulating means between its inlet and outlet;

a second compressor having a fluid inlet, a fluid outlet and a compressing means between its inlet and outlet;

a fluid conduit means operatively connecting the outlet of said second passageway arrangement of the first heat exchanger to the inlet of said turbine, said fluid conduit means passing through the combustion chamber of the gas turbine sub-system allowing the fluid to receive heat energy from said combustion chamber inorder to drive said turbine of the steam turbine sub-system;

a means operatively conncting the outlet of said turbine to the inlet of said fluid duct;

a means operatively connecting the outlet of said fluid duct to the inlet of said first compressor;

a means operatively connecting the outlet of said first compressor to the inlet of the first passageway arrangement of the first heat exchanger;

a fluid conduit means operatively connecting the outlet of said first passageway arrangement of the first heat exchanger to the inlet of said first passageway arrangement of the second heat exchanger;

a fluid conduit means operatively connecting the outlet of

the first passageway arrangement of the second heat exchanger to the inlet of said second compressor;

a fluid conduit means operatively connecting the outlet of said second compressor to the inlet of said second passageway arrangement of the first heat exchanger;

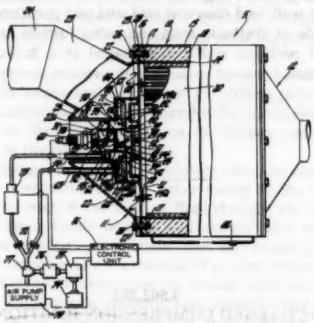
a fluid conduit means operatively connecting the following in a closed loop cycle, the outlet of said cooler to the inlet of the second passageway arrangement of the second heat exchanger, the outlet of said second passageway arrangement of the second heat exchanger to the inlet of said cooler;

4,502,278

DIESEL EXHAUST CLEANER AND BURNER SYSTEM WITH MULTI-POINT IGNITERS

Terrence L. Stark, Washington, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 25, 1983, Ser. No. 555,052
Int. Cl.³ F01N *3/02*
U.S. Cl. 60—303 **2 Claims**



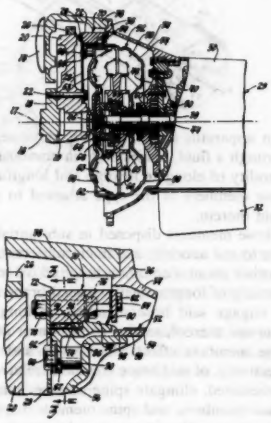
1. An exhaust cleaner and multi-point discharge burner system for use with a diesel engine, said system including a trap housing having an inlet at one end for receiving exhaust gas and an exhaust outlet at its opposite end; a filter means operatively positioned in said trap housing intermediate said inlet and said exhaust outlet and having an inlet end face axially spaced from said inlet; and, a multi-point discharge, fuel burner means operatively positioned in said inlet, said fuel burner means including a burner housing means having a supply chamber at one end with a solenoid valve controlled air/fuel inlet in flow communication therewith and a combustion chamber at its opposite end in flow communication with said supply chamber, a central point igniter extending axially from said combustion chamber to terminate at its other end in closely spaced apart relationship to said inlet end face, a plurality of flow passages extending radially outward from said combustion chamber; an igniter means operatively positioned in said burner housing means for effecting ignition of an air/fuel mixture in said combustion chamber; a second burner housing means encircling said burner housing and having a second supply chamber therein and an air/fuel inlet in flow communication therewith, said second burner housing having a first set of circumferentially spaced apart flame discharge tubes encircling said central point igniter and a second set of circumferential spaced apart flame discharge tubes encircling said first set of said flame discharge tubes and in flow communication with said second supply chamber and with said flow passages, said first and second sets of flame discharge tubes extending from the opposite end of said second burner housing means axially toward said inlet face.

4,502,279

TORQUE CONVERTER ATTACHMENT AND METHOD

Reece R. Fuehrer, Danville, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed May 9, 1983, Ser. No. 492,604
Int. Cl.³ F16D *33/00*
U.S. Cl. 60—330 **3 Claims**



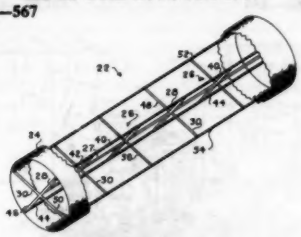
1. In combination with an engine having a block and an output member rotatable about a longitudinal axis of said block, a transmission having a case defining a main axis, and a torque converter supported on said case with an impeller housing thereof rotatable about said main axis, said torque converter impeller housing being shiftable as a unit with said transmission case toward said block to an assembled position relative to said output member corresponding to an assembled position of said transmission case relative to said block wherein said longitudinal and said main axes coincide, an attachment between said impeller housing and said output member comprising, means on said output member defining a plurality of internal splines, means on said impeller housing defining a plurality of external splines automatically engageable with said internal splines in said assembled position of said impeller housing and operable to join said output member and said impeller housing for unitary rotation, means on one of said output member and said impeller housing defining a ramp surface bounded by an elevated leading edge and a relatively depressed trailing edge, a tang on the other of said output member and said impeller housing engageable on said ramp surface in said assembled position of said impeller housing and operable to prevent separation of said impeller housing from said assembled position relative to said output member, said elevated leading edge contacting said tang during movement of said impeller housing to said assembled position thereof and operable to cam said tang over said leading edge thereby permitting unrestricted movement of said impeller housing to said assembled position, and spring means on said other of said output member and said impeller housing biasing said tang toward said ramp surface so that said impeller housing is automatically prevented from separating from said output member after said impeller housing achieves said assembled position.

4,502,280

HYDRAULIC APPLICATIONS

Walter T. McCoy, 4034 McKay Creek Dr., Clearwater, Fla. 33540

Filed Apr. 1, 1982, Ser. No. 364,440
Int. Cl.³ F01B 19/04; F16J 3/04
U.S. Cl. 60—567 4 Claims



1. An apparatus for controlling movement of an elongate arm through a fluid, comprising, in combination,

a plurality of elongate flexible and longitudinally extensible hose members of the type adapted to receive hydraulic fluid therein,

said hose members disposed in substantial parallelism relative to one another, and in circumferential relation to one another about a common longitudinal axis of symmetry,

a plurality of longitudinally spaced brace members adapted to engage said hose members at longitudinally spaced intervals thereof, so that extension or contraction of said hose members effects divergence and convergence, respectively, of said brace members, relative to one another,

an articulated, elongate spine member interconnecting said brace members, said spine member disposed substantially coincident with said common longitudinal axis of symmetry,

means for independently introducing or withdrawing hydraulic fluid into and out of said hose members, respectively, so that a curvature can be introduced into said arm attendant introduction and withdrawal of unequal amounts of hydraulic fluid into and out of different ones of said hose members,

said plurality of hose members being four in number,

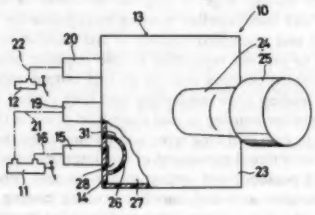
and each of said brace members having two substantially equal in length brace portions arrayed in orthogonal relation to one another such that their respective mid sections cross at the longitudinal axis of symmetry of the apparatus.

4,502,281

FLUID RESERVOIR

Susumu Arakawa, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jun. 17, 1982, Ser. No. 389,495
Claims priority, application Japan, Jun. 26, 1981, 56-93879[U]
Int. Cl.³ B60T 11/26
U.S. Cl. 60—585 2 Claims



1. A fluid reservoir for supplying fluid to master cylinder means arranged in hydrulic system means of an automotive vehicle comprising:

a reservoir tank having at least one fluid chamber therein and provided at a lower portion thereof with at least one outlet being offset from a center of said fluid chamber for supplying the fluid within said chamber to said master cylinder means;

partition means positioned within said reservoir tank for dividing said fluid chamber into larger and smaller fluid chambers, said smaller fluid chamber being in free fluid communication with said outlet and being in free fluid communication at a top thereof with said larger chamber, and said smaller chamber being much smaller than said larger chamber in both longitudinal and transverse directions of said vehicle; and

passage means formed in said partition means for establishing a restricted normal fluid communication between said larger and smaller chambers; and

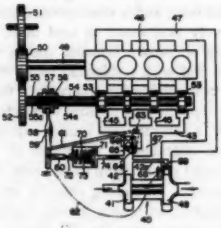
said outlet being positioned at a peripheral wall portion of said reservoir tank, and said partition means being a partition wall secured to said peripheral wall and a bottom wall portion of said reservoir, said passage means being formed as a slit extending downward from said top of said partition wall, said reservoir tank and said partition wall being made of synthetic resin and being formed as one piece, said partition wall being shaped in a half-circle cross section.

4,502,282

TURBO-CHARGED COMPRESSION IGNITION ENGINE OPERABLE AT SMALL COMPRESSION RATIO

Hiroshi Kanesaka, Kawasaki, Japan, assignor to Usui Kokusai Sangyo Kabushiki Kaisha, Sunto and Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho, Kawasaki, both of, Japan

Filed Jul. 14, 1983, Ser. No. 513,868
Int. Cl.³ F02B 37/00
U.S. Cl. 60—602 11 Claims



1. A turbo-charged compression ignition engine comprising:

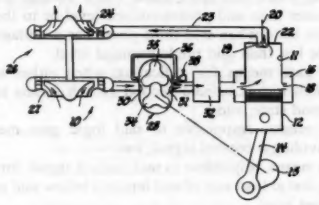
a turbo-charger for supercharging said engine, control means for controlling the timing of closing of an inlet passage of said engine, opening means for opening an exhaust valve of said engine at a point near bottom dead centre in the suction stroke, means for varying the area of a nozzle in the turbine of said turbo-charger and said last mentioned means defining a passage openable to the downstream side of said last mentioned means, and an inlet pipe communicating with said last mentioned passage.

4,502,283

TURBOCHARGED ENGINE DRIVEN POSITIVE DISPLACEMENT BLOWER HAVING A BYPASS PASSAGE

David M. Wandel, Farmington Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 24, 1982, Ser. No. 422,892
Int. Cl.³ F02B *37/04*
U.S. Cl. 60—609 **5 Claims**



1. The combination of an intake air supply system with an internal combustion engine having a cylinder charging air intake and an exhaust discharge, said intake air supply system including

an engine driven positive displacement blower having inlet and outlet means and an exhaust gas driven turbo-compressor connected in series whereby the compressor discharges to the blower inlet and the blower outlet discharges to the engine air intake,

a bypass passage connecting the blower inlet and outlet,

a pressure responsive control valve means in the bypass passage to control the flow of fluid through the bypass, and the improvement wherein said control valve means is operative to open and maintain open said bypass passage solely in response to the existence of predetermined superambient levels of pressure on the blower outlet side of the control valve means, whereby said control valve means permits bypass flow, substantially upon reaching or exceeding a predetermined blower discharge pressure, either (a) to recirculate air flow from the blower outlet to the inlet to reduce or limit the engine power absorbed by the blower or (b) to conduct additional air flow around the blower directly from the turbo-compressor to the engine intake to avoid the restriction of the blower to increased charging air flow, thereby providing a dual function capability in a single control valve means.

4,502,284

METHOD AND ENGINE FOR THE OBTAINMENT OF QUASI-ISOTHERMAL TRANSFORMATION IN GAS COMPRESSION AND EXPANSION

Andrei V. Chrisoghilos, Bucharest, Romania, assignor to Institutul Natzional de Motoare Termice, Bucharest, Romania

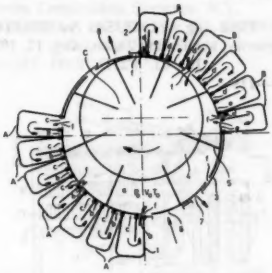
PCT No. PCT/RO81/00005, § 371 Date Jun. 3, 1982, § 102(e) Date Jun. 3, 1982, PCT Pub. No. WO82/01220, PCT Pub. Date Apr. 15, 1982
PCT Filed Sep. 7, 1981, Ser. No. 387,888
Claims priority, application Romania, Oct. 8, 1980, 102311
Int. Cl.³ F02G *1/04*
U.S. Cl. 60—682 **2 Claims**

1. A method of operating a thermal machine which comprises in each cycle of displacement of a movable member relative to a stationary member defining a variable-volume chamber with said movable member:

(a) communicating said chamber with a cooled heat exchanger through one orifice thereof and then communicating said chamber with said cooled heat exchanger through a second orifice thereof;

(b) repeating step (a) with a succession of such cooled heat exchangers while progressively altering the volume of said chamber as said movable member is displaced relative to said stationary member;

(c) thereafter communicating said chamber with a heated heat exchanger through a first and a second orifice thereof in succession as said chamber is swept therepast with movement of said movable member relative to said stationary member;



(d) repeating step (c) with a number of heated heat exchangers in succession while progressively changing the volume of said chamber as said movable member is displaced past said heated heat exchangers; and

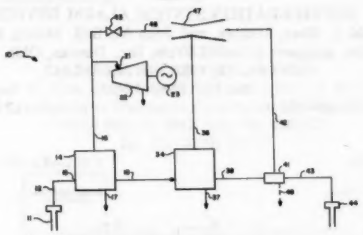
(e) controlling the work of said movable member and the communication of said chamber with heat exchangers to maintain the expansion and compression at said chamber substantially quasi-isothermal.

4,502,285

SILICA STABILIZATION AND REINJECTION FOR GEOTHERMAL METHOD AND APPARATUS

Leon Awerbuch, San Francisco, and Alfred N. Rogers, Pleasanton, both of Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jun. 22, 1983, Ser. No. 506,719
Int. Cl.³ F03G *7/00*
U.S. Cl. 60—641.5 **23 Claims**



1. In a system for processing fluid from a subterranean location with the fluid having an elevated temperature and pressure, having dissolved and suspended solids therein, and capable of being separated into solid, liquid and vapor fractions, apparatus comprising:

a reactor for receiving a flow of the fluid from a subterranean location;

means in the reactor for extracting the vapor fraction;

means coupled with the reactor for directing the separated liquid fraction out of the reactor; and

heating means cooperating with said liquid directing means and said vapor extracting means for using a controlled portion of the energy value in the extracted vapor fraction to heat the separated liquid fraction;

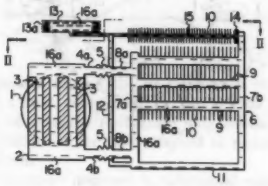
thereby stabilizing the dissolved and suspended solids in the separated liquid fraction.

4,502,286

CONSTANT PRESSURE TYPE BOILING COOLING SYSTEM

Sadayuki Okada, Katsuta; Hisao Sonobe, Ibaraki, and Tomoaki Mino, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 4, 1983, Ser. No. 520,514
Claims priority, application Japan, Aug. 11, 1982, 57-138395
Int. Cl.³ F25D *19/00*
U.S. Cl. 62—119 **5 Claims**



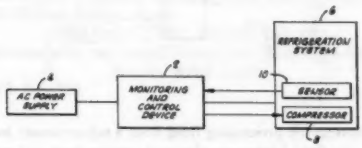
1. A constant pressure boiling cooling system comprising evaporators filled with liquid refrigerant for cooling heating generating bodies, a condenser for cooling and liquefying the vapour of the refrigerant from said evaporators and a variable volume refrigerant sump for absorbing pressure changes caused by the boiling of the refrigerant in said evaporators and said condenser, said evaporators and said condenser being arranged in substantially horizontal side by side relation and connected with one another at an upper and a lower portions of the side surfaces thereof by means of first and second communicating tubes respectively and said condenser comprising a plurality of condensing tubes located in substantially horizontal relation and two headers located in substantially vertical relation which are respectively connected to the both ends of said condensing tubes.

4,502,287

REFRIGERATION SYSTEM ALARM DEVICE

Harold L. Hare, Duncan, and John M. Bell, Moore, both of Okla., assignors to Safe-T-Frezz, Inc., Duncan, Okla.

Filed Jul. 18, 1983, Ser. No. 514,943
Int. Cl.³ F25B *49/00*
U.S. Cl. 62—126 **17 Claims**



1. An alarm apparatus, comprising:

power monitor means for detecting when at least one of a plurality of inputs of electrical power is below a predetermined level, said power monitor means including:

first terminal means for receiving a first alternating current power input having a first nominal voltage or a first phase of a three-phase power system;

second terminal means for receiving a second alternating current power input having a second nominal voltage or a second phase of said three-phase power system;

third terminal means for receiving a third phase of said three-phase power system;

first switch means for being switched to a first logic state when said second alternating current power input or said second phase has a voltage magnitude greater than said predetermined level or to a second logic state when said second alternating current power input or said second phase has a voltage magnitude less than said predetermined level;

second switch means for being switched to the first logic state when said third phase has a voltage magnitude greater than said predetermined level or to the second logic state when said third phase has a voltage magnitude less than said predetermined level;

logic gate means for indicating when either said first switch means or said second switch means is in said second state; and

timer means, responsive to said logic gate means, for providing a control signal; and

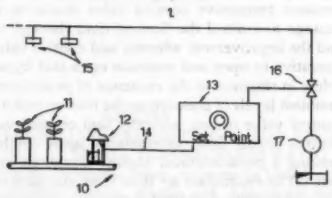
alarm means, responsive to said control signal, for indicating that at least one of said inputs is below said predetermined level.

4,502,288

MISTING CONTROL APPARATUS

Gary M. Lynch, M.S. 861, Fernvale, Queensland, 4305, Australia

Filed Aug. 23, 1982, Ser. No. 413,374
Claims priority, application Australia, Jan. 7, 1981, PE7164
Int. Cl.³ F28D *3/00*; F24F *11/00*
U.S. Cl. 62—171 **19 Claims**



1. Apparatus for controlling the application of mist or spray to an environment, said apparatus including:

a monitoring head, said monitoring head being disposed within said environment and including a housing;

a first temperature sensitive element disposed in an upper portion of said housing and being exposed to ambient conditions and mist or spray applied to said environment;

a second temperature sensitive element disposed in a lower portion of said housing and being maintained at the web bulb temperature of said environment;

means associated with said elements for measuring the difference in temperature sensed by said first and second temperature sensitive elements; and

means responsive to said measured temperature difference for controlling the application of said mist or spray to said environment.

4,502,289

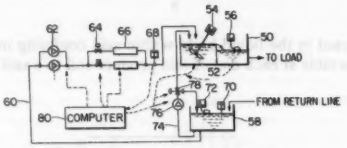
COLD WATER SUPPLY SYSTEM

Tsutomu Kayama, Nishisonogi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1983, Ser. No. 519,514
Claims priority, application Japan, Aug. 6, 1982, 57-137707
Int. Cl.³ F25D *17/02*
U.S. Cl. 62—185 **1 Claim**

1. A cold water supplying system in which return water from a load cooled to a predetermined low temperature by a refrigeration system of a variable refrigerating capacity is

stored in a cold water supply tank, and in which the flow rate of the return water for passing through said refrigerating system is regulated in accordance with a signal from a level detector disposed in the cold water supply tank, thereby maintaining a predetermined amount of cold water at a predetermined temperature within said cold water supply tank, comprising an agitating tank disposed within said cold water supply tank for receiving the cold water from said refrigerating system, a bypass piping means for directing a calculated amount of the return cold water into said agitator tank, a temperature measuring sensor for sensing the temperature of the return cold



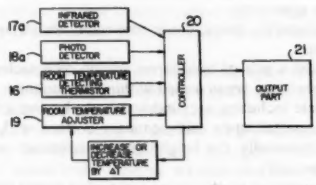
water, a refrigerating system outlet temperature detecting sensor for measuring the water temperature discharged from said refrigerating system, and a regulating means, which is responsive to said return cold water and refrigerating system discharge temperature sensors, for automatically regulating the cold water temperature supplied after being mixed from said refrigerating system and said bypass piping into said agitating tank to become said predetermined temperature; wherein said regulating means regulates said refrigeration system capacity and wherein said regulating means regulates said calculated amount of return cold water.

4,502,290

AIR CONDITIONER

Akio Suzuki; Mitsuo Akiyama, both of Tochigi; Susumu Kashiwazaki, Utsunomiya; Shigeyasu Suzuki; Yasunori Tominaga, both of Tochigi, and Michihisa Arakawa, Utsunomiya, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 5, 1983, Ser. No. 558,276
Claims priority, application Japan, Dec. 6, 1982, 57-212789
Int. Cl.³ F25B *1/00*; G05D *23/00*
U.S. Cl. 62—229 **2 Claims**



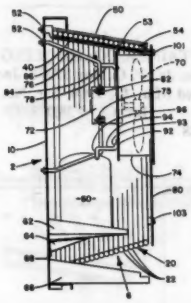
1. An air conditioner having a room temperature detector, a room temperature adjuster and a controller to cause said controller to control a compressor on the basis of an output from said room temperature detector so that a room temperature detected by said room temperature detector becomes equal to a predetermined temperature set in said room temperature adjuster, said air conditioner comprising a photodetector for generating a signal indicative of the illuminance at said photodetector to change said temperature set in said room temperature adjuster, by said controller, on the basis of said signal, first means for detecting a first illuminance having a predetermined value from the illuminance at said photodetector and second means for detecting a second illuminance having another predetermined value from the illuminance at said photodetector, and the output of said first means and the output of said second means are applied to said controller to change said temperature set in said room temperature adjuster, by said controller, in accordance with said outputs of said first and second means.

4,502,291

COMBINATION FAN MOTOR AND ORIFICE SUPPORT ASSEMBLY

Edward B. Shelton, Liverpool; Richmond S. Hayes, Jr., Fayetteville, and Robert M. Kozlowski, Syracuse, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 16, 1982, Ser. No. 450,391
Int. Cl.³ F25D *21/14*
U.S. Cl. 62—285 **9 Claims**



5. A heat exchange unit having an outdoor section defined in part by a vertically extending partition which comprises:

a peripherally encasing wound fin heat exchanger defining a central opening;

a plurality of spaced tube support assemblies for maintaining the wound fin heat exchanger in the desired configuration, said tube support assemblies being mounted to the partition for supporting the heat exchanger;

a leg assembly connected to the partition for supporting a fan motor and a fan orifice within the opening defined by the heat exchanger; and

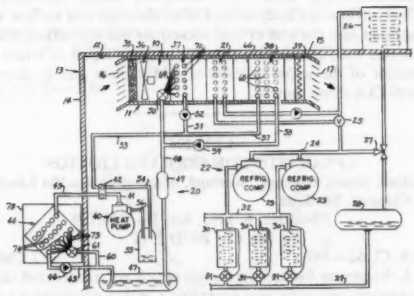
wherein the fan orifice is also secured to at least one of the tube support assemblies to maintain the fan orifice in the desired position.

4,502,292

CLIMATIC CONTROL SYSTEM

Roland A. Ares, and Mark W. Sylvester, both of St. Charles, Mo., assignors to Hussmann Corporation, Bridgeton, Mo.

Filed Nov. 3, 1982, Ser. No. 438,922
Int. Cl.³ F25B *27/02*
U.S. Cl. 62—238.6 **18 Claims**



1. A climatic control system for the seasonal heating and cooling of air circulated through a temperature control airway,

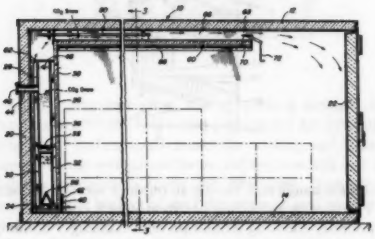
comprising a three coil, reverse cycle heat pump having a first coil exposed to ambient, a cooling mode coil and a separate heating mode coil spaced apart and being sequentially positioned in the direction of air flow through the airway and adapted for selective seasonal operation, and means for rendering said cooling mode coil non-operational during the reverse cycle heating mode of operation; and separate refrigeration system means including a heat reclaim condenser coil positioned in the airway intermediate of said cooling mode and heating mode coils and being adapted for selective operation therewith, said heating mode coil being larger than said heat reclaim condenser coil and substantially larger than said cooling mode coil.

4,502,293

CONTAINER CO_2 COOLING SYSTEM

Paul R. Franklin, Jr., P. O. Box 37978, Jacksonville, Fla. 32236

Filed Mar. 13, 1984, Ser. No. 589,697
Int. Cl.³ F25D 3/12
U.S. Cl. 62—388 **10 Claims**



1. A CO_2 cooled container including interconnected insulated top and bottom walls, opposite side walls and opposite end walls, an upstanding transverse insulated hollow housing mounted within said container adjacent one end wall thereof, a CO_2 snow cabinet disposed within said housing constructed of good heat transfer material and with opposing wall portions of said cabinet and housing in laterally spaced relation to define an airflow passage within said housing passing exteriorly about said cabinet, a heat insulative horizontal baffle mounted within said container spaced below said top wall and extending between said sidewalls, said baffle defining a cooled air passage beneath said top wall extending lengthwise of said container, said airflow passage including an outlet end adjacent and in at least reasonably closed communication with the end of said cooled air passage adjacent said one end wall and an inlet end opening outwardly of said housing into the interior of said container adjacent the end thereof remote from said housing, thermostatically controllable air pump means operative to effect airflow inwardly of said inlet, through said airflow passage and into the end of said cooled air passage adjacent said one end wall, and means operative to admit liquid CO_2 into the interior of the upper portion of said cabinet and to thereby form CO_2 snow therein.

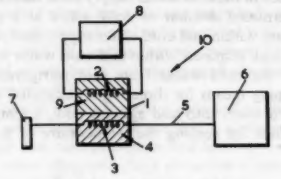
4,502,294

APPARATUS FOR COOLING LIQUIDS

Callum Grant, Glasgow, Scotland, assignor to Koolfio Limited, Glasgow, Scotland

Filed Dec. 6, 1983, Ser. No. 558,719
Int. Cl.³ B67D 5/62
U.S. Cl. 62—389 **7 Claims**

1. Apparatus for cooling liquids which are transported along a pipeline, said apparatus comprising means confining a volatile fluid having liquid and vapour phases co-existing during operation of the apparatus and respectively forming a liquid body and a vapour body, a refrigeration system incorporating a refrigerant coil, said refrigerant coil being immersed in the vapour body within said confining means, and a product coil



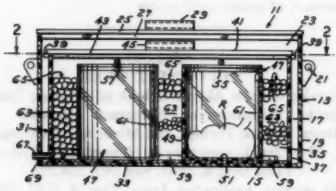
immersed in the liquid body within said confining means and connectable at each end of said product coil to a said pipeline.

4,502,295

ORGAN HYPOTHERMIC STORAGE UNIT

Luis H. Toledo-Pereyra, Grosse Pointe Farms, Mich., assignor to Mount Carmel Research and Education Corporation, Detroit, Mich.

Filed Feb. 21, 1984, Ser. No. 582,033
Int. Cl.³ F25D 3/02
U.S. Cl. 62—463 **9 Claims**



1. An organ hypothermic storage unit comprising a transparent plastic first container having side, end and bottom walls and an open top;

a transparent plastic cover removably sealed over said open top;

at least a pair of transparent plastic receptacles adapted to receive an organ nested within said container, each receptacle including a cylindrical body having a bottom wall supported upon said container bottom wall, a side wall substantially the height of said container walls and an open top;

a transparent plastic cover removably sealed thereover;

a plurality of groups of circularly spaced guide stops upon the container bottom wall, with the stops in each group arranged in a circle, each group of stops receiving and locating a receptacle for spacing the receptacles from each other and from the adjacent walls of said container defining a chilling zone within said container and extending around each receptacle;

an upright thermometer upon the interior side wall of each receptacle, visible through said wall;

and a horizontal drain pipe extending through one wall of said container adjacent its bottom wall;

said container adapted to receive and store a quantity of ice within said chilling zone for continuously maintaining an organ in any receptacle at a temperature between 0° and 7°, Centigrade approximately, for maximal metabolic suppression and preservation thereof until transplant to a recipient.

4,502,296

CRYOSTAT

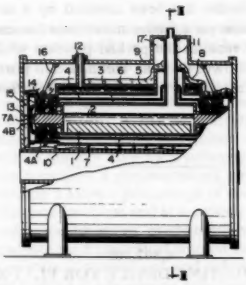
Hisanao Ogata; Takeo Nemoto; Yoshinori Hakuraku, all of Ibaraki, and Yasuomi Yagi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 26, 1984, Ser. No. 593,375

Claims priority, application Japan, Apr. 15, 1983, 58-65371; Aug. 29, 1983, 58-156239

Int. Cl.³ F25B 19/00

U.S. Cl. 62—514 R 2 Claims



1. A cryostat comprising:

a hollow cylindrical liquid helium vessel containing a superconductive magnet coil and liquid helium;

a plurality of cylindrical heat insulating plates enclosing said hollow cylindrical liquid helium vessel;

a liquid nitrogen vessel located outwardly of one of said plurality of cylindrical heat insulating plates in enclosing relation;

a vacuum vessel enclosing said liquid nitrogen vessel and having a hollow room temperature space section formed substantially in a central portion; and

a plurality of rods formed of material of low thermal conductivity for supporting said liquid nitrogen vessel in said vacuum vessel under tension; wherein the improvement resides in that:

said liquid helium vessel extends substantially horizontally and has a plurality of shaft-like projections each extending outwardly from one of opposite end walls thereof;

said liquid nitrogen vessel extends substantially horizontally and has a plurality of hollow cylindrical portions each formed at one of opposite ends thereof in positions corresponding to said shaft-like portions of the liquid helium vessel so that the shaft-like projections and the hollow cylindrical portions are located concentrically with each other; and

a plurality of support structures each composed of a multiple cylinder of small thickness formed of material of low thermal conductivity connecting said shaft-like projections to said hollow cylindrical portions, said multiple cylinder including a plurality of cylinders connected to each other alternately at opposite ends and in central portions.

4,502,297

EVAPORATOR PARTICULARLY SUITABLE FOR AIR CONDITIONERS IN AUTOMOTIVE VEHICLES

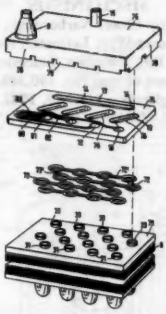
Wilfried Winterer, Leinfelden-Echterdingen, Fed. Rep. of Germany, assignor to Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH & Co., KG, Stuttgart, Fed. Rep. of Germany

Division of Ser. No. 394,876, Jul. 2, 1982, Pat. No. 4,430,868. This application Nov. 22, 1983, Ser. No. 554,306

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1981, 31501

Int. Cl.³ F25B 39/02

U.S. Cl. 62—515 14 Claims



1. An evaporator, comprising:

a connector member comprising at least two plates located one above the other;

a Venturi distributor connected to said connector member for receiving and distributing a coolant, wherein said Venturi distributor divides said coolant into a plurality of streams;

a plurality of channels arranged as grooves on the surface of one of said two plates and covered by the other of said two plates for conducting the coolant streams from said Venturi distributor, said channels corresponding in number to said streams with each channel being positioned to receive one of said streams from said Venturi distributor;

a plurality of evaporator pipes connected to said connector member in parallel flow arrangement, said pipes corresponding in number to said channels with each pipe being connected to one of said channels, thereby forming a continuous coolant flow path from said Venturi distributor via said channels to said evaporator pipes; and

a collection chamber formed in said connector member for receiving said coolant from said pipes.

4,502,298

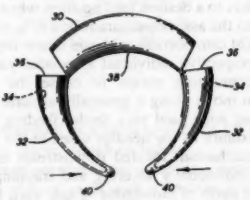
CHAMBERED BRACELET

Diana L. Benton, 1003 Franklin St., Watertown, N.Y. 13601

Filed Sep. 15, 1983, Ser. No. 532,463

Int. Cl.³ A44C 5/00

U.S. Cl. 63—1 R 2 Claims



1. A chambered bracelet of the split ring type comprising an

arcuate medial portion and a pair of opposed arcuate leg portions positioned on opposite sides of the medial portion, the medial and leg portions being discrete elements, and a strip spring member connecting the three portions in contiguous, end to end relation, each leg portion being hollow and open at its end adjacent the medial portion, the spring member permitting the leg portions to be pivoted away from the medial portion to expose their open ends.

4,502,299

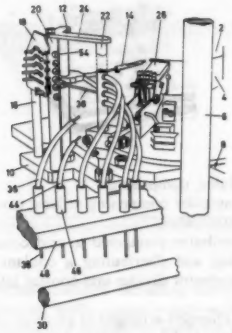
YARN FEEDER MECHANISMS AND DOUBLE CYLINDER KNITTING MACHINES HAVING SUCH MECHANISMS

Frederick Keel, 10 Roy Close, Narborough, Leicester; Keith G. Townsend, 55 Winders Way, Leicester, and Marshall C. Carter, 7 Earls Wood Rd., Evington, Leicester, all of England

Continuation-in-part of Ser. No. 180,380, Aug. 22, 1980, abandoned. This application Nov. 29, 1982, Ser. No. 445,056

Int. Cl.³ D04B *9/10, 9/34, 15/60*

U.S. Cl. 66—14 **16 Claims**



1. In a double cylinder knitting machine, the knitting machine having needle cylinders which define an axis, the machine also having needles with latches, the machine further having sinkers and a latchguard, an improved mechanism for feeding yarn to the needles comprising:

a plurality of individual yarn feeders, said yarn feeders being pivotal about an axis parallel to the axis of the knitting machine cylinders and having yarn feeding ends at first ends thereof;

cam means for each of said yarn feeders, said cam means each comprising a rotatable cam and an associated cam follower, said rotatable cams having intermediate height portions disposed between high and low cam portions and inclines between adjacent of said cam portions;

means for interconnecting each of said cam means cam followers to an associated yarn feeder, said interconnecting means each including a wire extending through a sleeve and means for adjusting the position of a first end of said sleeve to thereby adjust the effective length of said wire, said adjusting means permitting adjustment of the yarn feeders to a desired feed position when in the feeding zone when the associated cam follower is on said intermediate height cam portion, said cam means imparting movement to respective individual associated yard feeders via an interconnecting means to cause the feeding ends thereof to move along a generally arcuate path through the feeding zone, said yarn feeder feeding ends being in close proximity to the needles when in the feeding zone;

a trapper mechanism located downstream of the feeding zone for individually severing and trapping yarn at one end of the paths of movement of said yarn feeder feeding ends;

stop means for arresting the movement of said yarn feeder feeding ends in predetermined parked positions, said parked positions being located upstream of the feeding zone and at the other end of the paths of movement of said yarn feeder feeding ends;

guide means for controlling the movement of the said yarn feeders, said guide means enabling said yarn feeders to pass one another upstream of the feeding zone, said guide means having flat portions for holding said yarn feeder feeding ends at a constant axial position relative to the cylinders when in the feeding zone; and

lost motion means associated with each of said yarn feeders, each of said lost motion means including means for resiliently restraining one of said interconnecting means sleeves, said resilient restraining means being stressed to permit the sleeve to move as the wire of said one interconnecting means moves with the associated cam follower to follow a high cam portion and pass a cam incline after the associated feeder has been arrested by a stop means to thereby enable yarn feeder movement to cease when the yarn feeder reaches the parked position while its associated cam follower is on an inclined cam portion and said stop means arrests further yarn feeder motion.

4,502,300

TENSION ADJUSTING DEVICE FOR FLAT KNITTING MACHINES

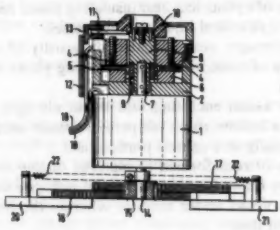
Reinhold Schimko, Aalen-Wasseralfingen; Franz Radl, Westhausen, and Max Fuchs, Ellwangen, all of Fed. Rep. of Germany, assignors to Universal Maschinenfabrik Dr. Rudolf Schieber GmbH & Co. KG, Westhausen, Fed. Rep. of Germany

Filed Dec. 7, 1983, Ser. No. 559,075

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1983, 3245230

Int. Cl.³ D04B *7/00*

U.S. Cl. 66—71 **11 Claims**



1. In a flat knitting machine having a reciprocable carriage incorporating cam systems comprising retractor elements for the needles,

a tension adjusting device for adjusting the retractor elements to set the stitch tension,

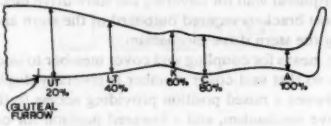
said device comprising, on the carriage, a single stepping motor for counterbalanced adjustment of the leading and of the trailing retractor element of each cam system, a position sensor on the stepping motor, pinion means connected for fixed rotation with the stepping motor, and two rack means, said pinion means being in counterbalanced meshing engagement with said two rack means, one of said rack means being connected to one of the retractor elements and the other rack means being connected to the other retractor element.

4,502,301

SUPPORT STOCKING PRODUCT OR THE LIKE

Roger T. Swallow, Asheboro; William R. Jackson, Raleigh, and Jack D. Pierce, Asheboro, all of N.C., assignors to Rampon Products, Inc., Asheboro, N.C.

Filed Sep. 29, 1982, Ser. No. 428,111
Int. Cl.³ D04B 9/52
U.S. Cl. 66—178 A **4 Claims**



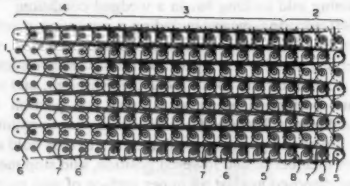
1. An elasticized knit-fabric seamless garment adapted to substantially fit an anatomic form such as a human limb and exhibiting throughout the length of some predetermined portion of such garment when fitted to said form at each of plural reference locations, such as at the ankle, calf, knee, lower and upper thigh locations on the leg, spaced apart by some plural number of uniform predetermined increments of lengthwise measurement which number may vary between selected successive reference locations, a predetermined amount of compression representing a known percentage of the compression at one of the reference locations and at locations between each pair of such reference locations predetermined amounts of compression graduated in a controlled amount such that in said predetermined portion a plurality of said reference locations are included and starting at a beginning reference location, e.g. the ankle, and ending at an end reference location, e.g. the upper thigh, the compression from each reference location to the next successive reference location throughout said predetermined portion changes in a substantially linear relation and providing an overall non-linear change between said beginning and end reference locations and exclusively linear changes between each pair of said reference locations and exclusively linear changes between each pair of said reference locations.

4,502,302

KNITTED SUPPORT TAPE OF SLIDE FASTENER

Yoshio Matsuda, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Continuation of Ser. No. 283,106, Jul. 13, 1981, abandoned. This application Nov. 8, 1983, Ser. No. 549,742
Claims priority, application Japan, Aug. 8, 1980, 55/109662
Int. Cl.³ D04B 23/08
U.S. Cl. 66—193 **3 Claims**



1. A support tape of warp-knit material for a slide fastener comprising:

(a) a first area extending along one side of said support tape and having a structure making it hard to stretch longitudinally and laterally, said first area being provided for supporting a row of fastener elements;

(b) a second area extending along the side of said support tape opposite said first area and at which said tape is sewn on a member to which it should be attached, said second area being formed of only weft yarns laid-in extending laterally coursewise of a plurality of wales and tricot stitches extending transversely laterally of said weft yarns coursewise between at least two wales making said second area relatively easy to stretch longitudinally;

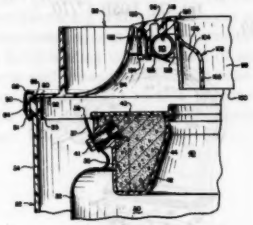
(c) a third area between said first and second areas having laid-in wefts and tricot stitches.

4,502,303

WASHING MACHINE TUB CONSTRUCTION

William A. Wasemann, Mansfield, Ohio, assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Oct. 31, 1983, Ser. No. 546,847
Int. Cl.³ D06F 37/24
U.S. Cl. 68—23.2 **3 Claims**



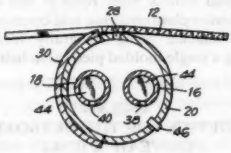
1. A washing machine having an outer tub with an open top, a spin tub mounted inside said outer tub for rotation about a vertical axis and having an open upper end adjacent the outer tub open top, said open upper end having an outwardly and upwardly flaring surface, a weighted balance ring mounted on the inside of said flaring surface and extending radially inwardly toward said vertical axis partially over said open upper end, said balance ring having projecting bosses at a plurality of spaced points around its periphery extending toward and in abutting contact with said flaring surface, a threaded fastener at each of said bosses extending through said spin tub and engaging said balance ring at each of said bosses to clamp said boss against said flaring surface, said balance ring contacting said spin tub only at said bosses, said balance ring having a rigid core of weight material and a layer of plastic material completely covering and enclosing said weight material.

4,502,304

FOAM APPLICATOR FOR WIDE FABRICS

Gregory J. Hopkins, Charlotte, N.C., assignor to Dexter Chemical Corporation, New York, N.Y.

Filed May 1, 1984, Ser. No. 605,870
Int. Cl.³ D06B 1/08
U.S. Cl. 68—200 **10 Claims**



1. A pressure manifold of a foam applicator for delivery of foam to a moving fabric, which includes:

at least one pair of parallel, inner conduits communicating at at least one end of each with a source of foam under pressure, each of the inner conduits having formed therein at least one effluent port extending along a portion of the length thereof, the effluent port of one inner conduit being

offset axially from that of the other to distribute the foam evenly along the length of the pressure manifold; and

an outer conduit having a diameter which is greater than the combined diameters of the inner conduits and surrouding the inner conduits, the outer conduit having formed therein a slotted port extending along a portion of the length thereof for delivery of foam under pressure to a moving fabric passing across the slotted port.

4,502,305

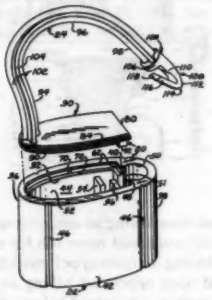
SECURITY DEVICE

John A. Bakker, Bartlett, Ill., assignor to Illinois Tool Works, Inc., Chicago, Ill.

Filed Mar. 1, 1983, Ser. No. 470,907

Int. Cl.³ E05B *67/10*

U.S. Cl. 70—49 **9 Claims**



1. A security latch formed as a molded plastic padlock comprising a one-pice molded hollow plastic body having a latching area opening exteriorly and having external access means to said latching area for receipt of a releasing means, and a molded plastic shackle having an end insertable into said latching area, said shackle end having integral latch means thereon for retaining said shackle end in said latching area, said latch means being releasable by releasing means inserted into said access means, said hollow body open at one end, a member comprising a closure plate covering said open end, said closure plate and said hollow body have cooperating snap-over fastening means for retaining said plate on said body.

2. A security latch formed as a molded plastic padlock comprising a one-piece molded hollow plastic body having a latching area opening exteriorly and having external access means to said latching area for receipt of a releasing means, and a molded plastic shackle having an end insertable into said latching area, said shackle end having integral latch means thereon for retaining said shackle end in said latching area, said latch means being releasable by releasing means inserted into said access means, said hollow body open at one end, a member comprising a closure plate covering said open end, said closure plate and said shackle being integrally formed therewith thereby forming a single molded piece attachable to said body.

4,502,306

LOCKING DEVICE FOR THE OUTBOARD STERN DRIVE OF A BOAT

Paul Scammacca, 7202 Ft. Hamilton Pkwy., Brooklyn, N.Y. 11228

Filed Jul. 15, 1982, Ser. No. 398,752

Int. Cl.³ B65D *55/14*; E05C *17/54*; F16B *41/00*

U.S. Cl. 70—159 **9 Claims**

1. A locking device for locking an outboard stern drive mechanism against removal from a stern of a boat and for preventing any steering of the boat by rotation of the stern drive mechanism through an operating lever, the stern drive mechanism being secured to an outside of the stern by a plurality of fastening members, the stern drive mechanism including an exhaust housing and an exhaust housing cover secured together by securing members, the exhaust housing having an exhaust opening therein, and the operating lever being connected to the exhaust housing, said locking device comprising:

(1) first means for locking the stern drive mechanism against removal from the stern, said first means including:

a cover member having a U-shaped peripheral wall and a flange inwardly directed from an upper edge of said peripheral wall for covering the stern drive mechanism;

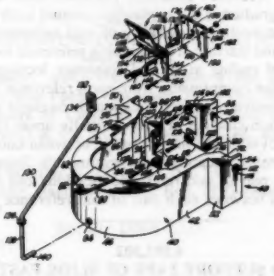
support brackets secured outboard of the stern and flanking the stern drive mechanism;

pivot means for coupling said cover member to said brackets so that said cover member is pivotally displaceable between a raised position providing access to the stern drive mechanism, and a lowered position for covering the stern drive mechanism;

said inwardly directed flange providing partial top wall means for covering the securing members when said cover member is in said lowered position to prevent unauthorized access to the securing members;

said cover member including cover means for covering the fastening members when said cover member is in said lowered position to prevent unauthorized access to the fastening members;

locking means for securely locking said cover member in



said lowered position, said locking means including a locking bar for wedging between said cover member and the stern, first securing means for securing said locking bar to said cover member and second securing means for securing said locking bar to the stern for retaining said locking bar in a wedged condition;

said first securing means including a receiving member extending outwardly from said cover member, said receiving member having an aperture to receive a lower end portion of said locking bar therethrough, and stop means positioned along said lower end portion and spaced from a lower end of said locking bar to maintain said lower end portion in said aperture to thus hold said cover member in said lowered position, said stop means being disposed against an upper surface of said receiving member; and

(2) second means for preventing the steering of the boat, said second means including:

said cover member being provided with an aperture in said peripheral wall in alignment with the exhaust opening when said cover member is in said lowered position;

finger means extending through said peripheral wall aperture and into the exhaust opening for thereby preventing rotation of the stern drive mechanism when said cover member is in said lowered position;

said finger means including an inwardly directed finger extending from said lower end of said locking bar.

4,502,307

WIRE BENDING MACHINE

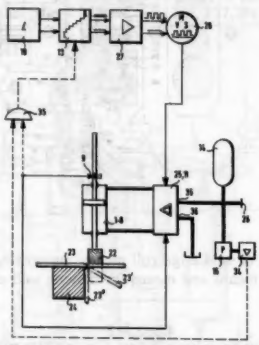
Rudolf Grunewald, Graf-Engelbert-Str. 12, 5657 Haan 1, Fed. Rep. of Germany

Filed Feb. 15, 1983, Ser. No. 466,615

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1982, 3205740

Int. Cl.³ B21C *31/00*

U.S. Cl. 72—22 11 Claims



1. A wire bending machine for bending an intermittently advancing wire to a predetermined configuration comprising hydraulically driven, controlled bending tool slides or pushers, a hydraulic pump, a pressure reservoir and a valve comparator operatively connected to numerically controlled hydraulic cylinders of the bending tool slides, and having a control system for controlling the bending tool slides so that total tool stroke needed for bending a given wire section is sub-divided into several discreet part-strokes with a dwell between successive part-strokes and a return stroke of the tool is effected at the end of the bending operation wherein the hydraulic cylinders or bending tool slides are equipped with travel-pick-ups, the signals of which are compared with preselected rated values in said comparator of the control system so that the drive of the hydraulic cylinders remains switched on up to the moment when the rated value is reached.

4,502,308

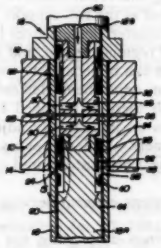
SWAGING APPARATUS HAVING ELASTICALLY DEFORMABLE MEMBERS WITH SEGMENTED SUPPORTS

John W. Kelly, LaCanada, Calif., assignor to Haskel, Inc., Burbank, Calif.

Filed Jan. 22, 1982, Ser. No. 341,795

Int. Cl.³ B21D *39/08*

U.S. Cl. 72—58 23 Claims



1. A hydraulic swaging apparatus for radially expanding a tubular structure comprising:

a mandrel to be inserted axially within said tubular structure, thereby defining an annular pressure zone between said mandrel and said structure, said mandrel also defining a conduit by which a pressurized hydraulic fluid can be introduced into said zone; and

a pair of axially separated seal means encircling said mandrel and thereby defining the axial boundaries of said pressure zone, at least one of said seal means comprising (1) a support formed by a plurality of arcuate segments arranged to define a cylinder encircling said mandrel and providing an annular abutment surface facing toward said pressure zone, (2) at least one elastically deformable member encircling said mandrel on the high pressure side of said support to expand radially upon the application of hydraulic pressure thereto, said elastically deformable member interfacing with said abutment surface and being thus restrained against axial deformation, and (3) cam means for spreading said segments of said support in response to said pressure within said zone and thereby expanding said abutment surface radially and preventing inelastic axial deformation of said elastically deformable member.

4,502,309

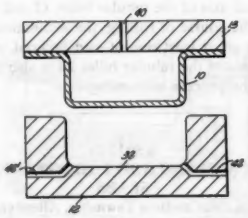
METHOD OF REMOVING FORMED PARTS FROM A DIE

Charles H. Hamilton, Thousand Oaks, and Paul R. Puhaczewski, Torrance, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 151,497, May 19, 1980, Pat. No. 4,381,657. This application Apr. 4, 1983, Ser. No. 481,559

Int. Cl.³ B21D *26/04*

U.S. Cl. 72—60 4 Claims



1. A method of removing a formed part from a die, said part produced by clamping a preform between first and second dies, bringing said preform to within an elevated temperature range suitable for superplastic forming of said preform, and applying pressure to said preform to superplastically form at least a portion of said preform into a cavity of said first die, comprising the steps of:

drawing a vacuum between at least a portion of said part and said second die such that said part is secured to said second die; and

separating said second die from said first die while said part is within said temperature range and secured to said second die, such that said part is withdrawn from said cavity of said first die.

4,502,310
CONVEYOR ROLLER AND METHOD OF MANUFACTURE THEREOF

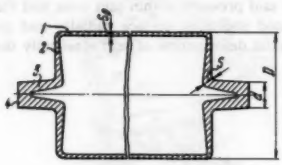
Anatoly N. Gnutov, Moscow; Boris S. Golberg, Nikolaev; Nadezhda N. Zelenskaya, Kramatorsk; Vladimir G. Kaporovich, Kramatorsk; Vladimir V. Kaporovich, Kramatorsk; Varlen K. Pirogov; Jury V. Romanov, both of Moscow; Viktor G. Sereda, Kramatorsk; Jury P. Sidorov, Moscow; Vitaly K. Udovenko, Kramatorsk, and Aron N. Tsoglin, Moscow, all of U.S.S.R., assignors to Gosudarstvenny Proektny I Konstruktorsky Institut Sojuzprommekhanizatsia, Moscow, U.S.S.R.

PCT No. PCT/SU79/00054, § 371 Date Mar. 9, 1981, § 102(e) Date Mar. 9, 1981, PCT Pub. No. WO81/00094, PCT Pub. Date Jan. 22, 1981

PCT Filed Jul. 9, 1979, Ser. No. 253,524

Int. Cl.³ B21H *1/00*

U.S. Cl. 72—69 **2 Claims**



1. A method of manufacturing conveyor rollers having a hollow cylindrical shell with end walls and axle shafts for mounting bearings, wherein the ends of a rotating tubular billet heated to a forging temperature are rolled consecutively until truncated cones are obtained, the method comprising the steps of rolling each end of a tubular billet **12** until a truncated cone **14** is obtained, the smaller base thereof being somewhat larger or equal to the diameter (d) of the roller axle shaft **3**; simultaneously forming the axle shaft **3** and the end wall **2** of the roller in the direction from the smaller base of the truncated cone **14** to its larger base while continuing the rolling of each end, the end wall of the roller being of a variable thickness which grows radially into the cylindrical shell **1** from the periphery to its geometrical axis, wherein the truncated cone **14** is rolled by simultaneously forming at last two tapered portions **15, 16** whose generatrices are arranged at different angles (ϕ_1,ϕ_2) to the geometrical axis of the tubular billet **12** and vary in length gradually in the course of rolling; the inclination angle (ϕ_1) of the generatrix of at least one of said tapered portions to the geometrical axis of the tubular billet **12** is also being changed gradually in the process of forming.

4,502,311
APPARATUS AND METHOD FOR PRESS-EDGING HOT SLABS

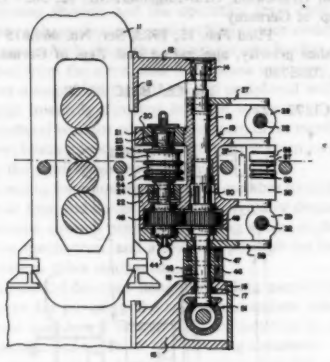
Werner W. Eibe, McCandless Township, Allegheny County, Pa., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Dec. 8, 1982, Ser. No. 447,790

Int. Cl.³ B21B *15/00*

U.S. Cl. 72—206 **10 Claims**

1. Apparatus for forging and rolling hot slabs to a reduced width in the roughing train of a hot strip mill comprising vertically positioned grooved die means for edge forging the leading end of a slab so as to taper that end to a width less than the desired width of the pass, vertically positioned grooved edge roll means for edge rolling the forged slab from its tapered end over its length, mounting means for said die means and said edge roll means movable to bring either said die means or said edge roll means against the slab in working position, said mounting means comprising a pair of arms pivoted intermediate their ends on vertical pivots and carrying the die means and the edge rolls at opposite ends, means connected with said mounting means for applying working pressure to



said die means or said edge roll means, supporting means for said mounting means and means for driving said edge rolls.

4,502,312
APPARATUS FOR CONTROLLING THE PRESSING FORCE BETWEEN A CONTROLLED DEFLECTION ROLL AND A COUNTER ELEMENT

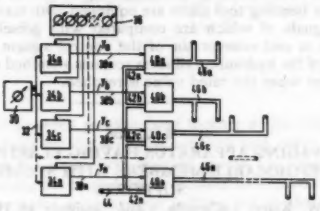
Ignazio Marchioro, Schio, Italy, assignor to Escher Wyss Aktiengesellschaft, Zurich, Switzerland

Filed Dec. 28, 1981, Ser. No. 334,642

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1981, 3101114

Int. Cl.³ B21B *37/08*; B30B *15/14*

U.S. Cl. 72—243 **5 Claims**



1. In an arrangement for controlling the pressing force between a counter element and a controlled deflection roll having a roll shell and a roll support for supporting said roll shell, wherein force-applying sources distributively arranged in axial direction and supported at the roll support serve to press the roll shell against the counter element over its entire length or at one or a number of regions thereof, and wherein groups of force-applying sources can be separately controlled and there is provided a common adjustment element for the pressing force following which there is arranged for each group of force-applying sources an individually adjustable regulation element, the improvement which comprises:

said regulation element being structured as control converters;

the common adjustment element serving for generating a control signal x;

said control converters converting the common control signal x generated by the common adjustment element in accordance with the relationship $y_i = a_i x + b_i$ into force-proportional group control signals y ($Y, Y_2 \ldots Y_n$); and

in each regulation element the values a_i, b_i are essentially constant over the entire range of the pressing forces and

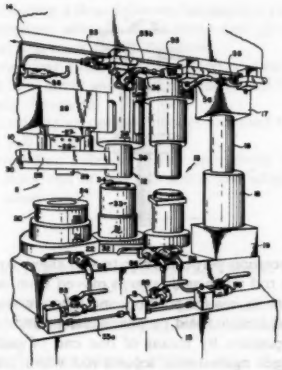
are dimensioned in such a manner that in the presence of two predetermined values of the mean pressing force there prevail at a rolled product minimum deviations of the product profile over the roll shell length.

4,502,313

TOOLING ADJUSTMENT

Thomas L. Phalin, Cary, and James J. Ulmes, Palatine, both of Ill., assignors to American Can Company, Greenwich, Conn.

Filed May 12, 1982, Ser. No. 377,331
Int. Cl.³ B21B *22/00*
U.S. Cl. 72—342 **7 Claims**



1. In an apparatus for drawing and ironing a container from material without coolant being applied directly to said material including a press frame for supporting tooling for reciprocating movement where said tooling includes punch means and die means for drawing and ironing said material captured therebetween into a thin walled hollow container having a cup-shape, the improvement comprising:

adjacent surfaces on said punch and die means for defining a space therebetween through which said material must pass during forming;

coolant passages provided in said die means for permitting coolant to flow therethrough without said coolant contacting said material;

flow regulating means associated with said die means coolant passages for adjusting the rate of said coolant allowed to pass through said die means in accordance with variations in said material and to effect said space, between said adjacent surfaces by increasing or decreasing said die means surface position toward or away from said punch means surface; and

temperature control means connected to said die means passages to change the temperature of said coolant in accordance with variations in said material and to effect said space, between said adjacent surfaces by increasing or decreasing said die means surface position toward or away from said punch means surface.

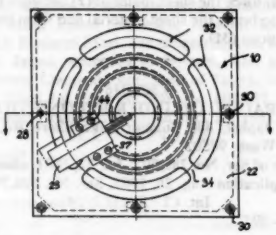
4,502,314

AUTOMATIC BENDING MACHINE

Adolf Wünsch, Haus Nr. 210, 8959 Seeg-Ried, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 250,691, Apr. 3, 1981, abandoned. This application Jul. 17, 1984, Ser. No. 631,020
Int. Cl.³ B21D *7/00*
U.S. Cl. 72—380 **5 Claims**

1. A rectangular box-like housing for a bending machine, the housing having a front wall with a front face, comprising a front plate removably fastened to the front face of the housing, a partition wall extending in parallel relationship with the front plate and being integrally formed with the housing, the partition wall separating the housing into a front chamber and a rearward chamber within said housing, an elongated central hollow hub integrally formed with said partition wall and extending axially through said front chamber, a central driving gear wheel mounted for rotation on said hollow hub within the front chamber, the hollow hub extending axially beyond the front face of the housing, the front plate having a central



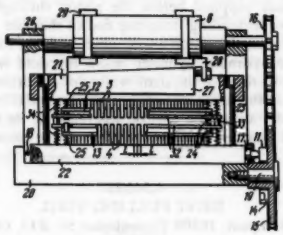
opening, the hollow hub projecting into said front plate adjacent the central opening, said hollow hub thereby acting as means for centering the front plate, the front plate having a plurality of openings comprising through-holes extended through the front plate and arranged at an equal radial distance from the central opening for the passage of driving shafts which are designed to drivingly engage with said central driving gear wheel.

4,502,315

DEVICE FOR CORRUGATING SHEET MATERIAL

Evgeny V. Dubrovsky; Viktor P. Dunaev, and Anatoly I. Kuzin, all of Moscow, U.S.S.R., assignors to Gosadarstvenny Sojuzny Nauchno-Issledovatelsky Traktorny Institut, Moscow, U.S.S.R.

PCT No. PCT/SU81/00066, § 371 Date Jun. 10, 1982, § 102(e) Date Jun. 10, 1982, PCT Pub. No. WO82/02009, PCT Pub. Date Jun. 24, 1982
PCT Filed Jul. 30, 1981, Ser. No. 395,089
Claims priority, application U.S.S.R., Dec. 10, 1980, 3210751
Int. Cl.³ B21D *13/02, 13/10*
U.S. Cl. 72—385 **4 Claims**



1. A device for corrugating sheet material advanced along a feeding direction in a feeding plane and forming staggered-cut corrugations (31), comprising at least two punches (3,4) arranged in a common plane substantially normal to the directions of movements of the sheet material and said two punches (3,4) being staggered from each other on opposite sides of the plane of feeding the material—one of the punches (4) being static and means for reciprocating the other of the punches (3) with respect to the static punch (4) in the plane in which said punches (3,4) are arranged—and a mechanism (1) for feeding the sheet material to the punches (3,4) and means for reciprocating the punches (3,4) in the plane in which said punches

(3,4) are arranged in a direction at right angles to the direction of reciprocation of the movable punch (3); and dies (12,13) arranged on both side of the punches (3,4) so that clearances (38,39) thus formed between the outer forming surfaces of the punches (3,4) and the surfaces of the cavities of the dies (12,13) are at least equal to the thickness of the sheet material (2) corrugated, and means for reciprocating the dies (12,13) with respect to the punches (3,4) in planes that are parallel to the plane in which said punches (3,4) are arranged and in a direction of reciprocation of the movable punch (3) so that said punches (3,4) force the sheet material (2) between the opposing dies (12,13) to break the sheet material and form the staggered-cut corrugations (31).

4,502,316

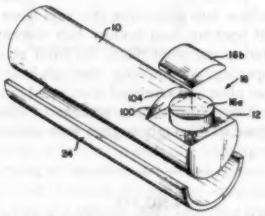
HYDRAULIC CYLINDER RECONDITIONER

William D. Japhet, 430 Summit Lake Shore Rd. Northwest, Olympia, Wash. 98502

Continuation of Ser. No. 285,807, Jul. 22, 1981, abandoned. This application Aug. 26, 1983, Ser. No. 526,790

Int. Cl.³ B21D *3/14*

U.S. Cl. 72—392 **9 Claims**



1. A hydraulic cylinder reconditioner to remove dents selectively from portions of a hydraulic cylinder without distorting the undented portion of the cylinder, leaving the cylinder in condition for reuse, comprising:

(a) a generally cylindrical base having a body and a cutout at one end of the body defining an axially extending wall and a radially extending wall forming a raised shoulder with the base for properly positioning the base below a dent; and

(b) a piston in the axially extending wall of the cutout, retractable below the shoulder, being radially extensible by pressure supplied below the piston through an internal channel extending from one end of the base to the cutout (1) to raise the piston into contact with the inside diameter of the hydraulic cylinder below the dent with sufficient force to remove the dent while not distorting the dimensions of the remainder of the cylinder and (2) to restore the cylinder to within a close tolerance of its original undented shape so that the cylinder can be reused.

4,502,317

DENT PULLING TOOL

John V. Hultquist, 10500 Westminster St. #13, Garden Grove, Calif. 92643

Continuation-in-part of Ser. No. 251,952, Apr. 7, 1981, Pat. No. 4,429,562. This application Oct. 3, 1983, Ser. No. 538,186

Int. Cl.³ B21D *1/12*

U.S. Cl. 72—479 **16 Claims**

1. A dent pulling tool comprising:

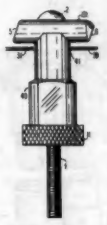
(a) an elongated shank having a head at one end which is larger than the diameter of the shank, wherein the other end of said shank is adapted to be attached to handle means;

(b) a cylinder mounted on said shank, said cylinder having an opening extending therethrough from one end of said cylinder to the other end, said cylinder having slots extending from opposite ends on opposite sides thereof in a manner and at a depth such that a transverse opening is defined which extends transversely through said cylinder; wherein said shank extends through said cylinder and said slots are dimensioned to receive said shank when said cylinder is oriented parallel to said shank; and wherein said transverse opening is sufficiently large to enable said cylinder to be tilted perpendicular to said shank;

(c) a lever slidably mounted on said shank between an outward position and an inward position;

(d) a first rod connected at one end to said lever and at its other end to said cylinder;

(e) a second rod secured to said shank, wherein said cylinder is pivoted from a first position parallel to said shank to a



second position perpendicular to said shank by means of said first rod when said lever is moved from its outward position to its inward position, and wherein said cylinder is pivoted from its said perpendicular position to its said parallel position by means of one end of said cylinder being urged against said second rod when said lever is moved to its outward position; and

(f) an elongated sheath having an opening therethrough from one end to the other, said sheath being slidably mounted on said shank between said cylinder and said lever, wherein the outside diameter of said sheath at the end nearest said cylinder is at least as large as the diameter of said head of said shank.

4,502,318

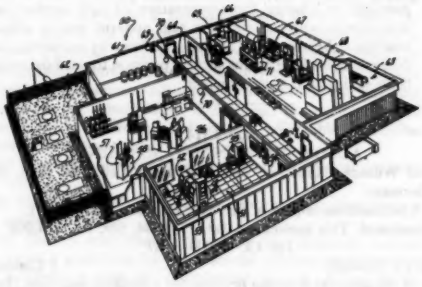
METHOD AND APPARATUS FOR CALIBRATING FLOW METERS

Vernon G. Converse, III, Franklin; James M. Bordato, Grosse Pointe Wds.; Theodore R. Bott, Berkley; Charles E. Foerster, Jr., Northville; Robert E. Miller, Ann Arbor; Ronald K. Mudge, Brighton, all of Mich.; Aldren M. Pace, Reseda, Calif., and Kent Van Allen, New Baltimore, Mich., assignors to Scans Associates, Inc., Livonia, Mich.

Filed Mar. 1, 1982, Ser. No. 353,206

Int. Cl.³ G01F *25/00*

U.S. Cl. 73—3 **49 Claims**



1. A method for calibrating glass tube flow meters, having

means to indicate the flow therethrough, said method including the steps of:

(a) causing the desired media to flow through said flow meter;

(b) measuring the media flowing through said flow meter for a fixed period of time;

(c) providing a control subsystem including fuel injectors;

(d) providing a monitoring subsystem;

(e) providing a weigh scale subsystem;

(f) providing a supply subsystem;

(g) providing a signal related to the flow through said flow meter by providing a flow detection subsystem, wherein the step of providing a flow detection subsystem to provide a signal related to the output of said flow meter includes the steps of:

(aa) providing a float follower, including a receiver and a transmitter, adapted to fit about said glass tube flow meter and track the float therein;

(bb) providing a ball screw mounted parallel to said glass tube flow meter and adapted to move said float follower axially therewith;

(cc) providing an optical encoder mounted to one end of said ball screw; and

(dd) providing a stepper motor operatively connected to the other end of said ball screw and adapted to rotate the same.

4,502,319

MULTI-TESTER FOR WATER TREATMENT METERING APPARATUS

Hans Arens, Wertingen, Fed. Rep. of Germany, assignor to 501 Grunbeck Wasseraufbereitung GmbH, Hochstadt, Fed. Rep. of Germany

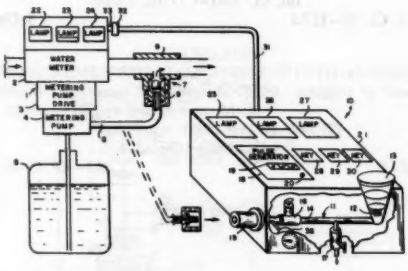
PCT No. PCT/EP82/00194, § 371 Date Mar. 25, 1983, § 102(e) Date Mar. 25, 1983, PCT Pub. No. WO83/00924, PCT Pub. Date Mar. 17, 1983

PCT Filed Sep. 7, 1982, Ser. No. 482,995

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1981, 3136112

Int. Cl.³ G01F *25/00*

U.S. Cl. 73—3 **7 Claims**



1. A testing appliance for a metering apparatus, said metering apparatus comprising a flow meter disposed in a main stream for providing control signals as a function of flow rate, and a metering pump having an input connected to said flow meter and an output connected to said main stream for pumping fluid into the main stream in correspondence with said control signals provided by said flow meter, and said testing appliance comprising:

a control unit having a control signal generator generating simulated control signals corresponding to said control signals provided by said flow meter, said control unit having an output which is connectable with said input of said metering pump, such that said simulated control signals are fed to said metering pump in place of the control signals provided by said flow meter, and a measuring device having an input which may be connected with said output of said metering pump, said measuring device measuring the quantity of fluid pumped in response to said simulated control signals.

4,502,320

METHOD AND APPARATUS FOR DIAGNOSING OIL-FILLED ELECTRIC APPARATUS

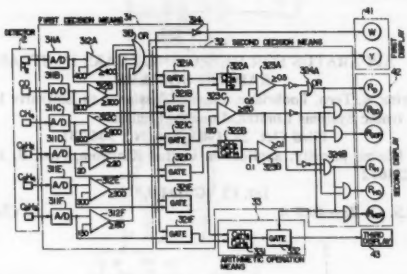
Seiichi Sakai, Kagawa; Toshihiko Gange, Takamatsu; Hideo Tsukioka, Mito; Katuo Sugawara, Hitachi; Ichitaro Tani, Kitaibaraki; Etsunori Mori, and Shigeo Shiono, both of Hitachi, all of Japan, assignors to Hitachi, Ltd. and Shikoku Electric Power Company, Inc., both of Tokyo, Japan

Filed Jul. 20, 1982, Ser. No. 400,157

Claims priority, application Japan, Jul. 27, 1981, 56-117927

Int. Cl.³ G01N *31/00*

U.S. Cl. 73—23 **25 Claims**



1. A method of diagnosing an oil-filled electric apparatus as to abnormality, comprising steps of:

detecting contents of a plurality of predetermined components contained in gas extracted from oil of said electric apparatus, said components bearing relevance to abnormality of said electric apparatus due to electric discharge and overheat;

determining the presence or absence of abnormality due to electric discharge or overheat by comparing the contents of said gas components with respective reference values;

determining the ratio of contents for at least one set of two selected components among those detected, when the presence of abnormality has been determined, and determining on the basis of the value of said ratio whether said abnormality is due to overheat or discharge; and

further including a step of arithmetically determining the temperature of overheat, if the abnormality is due to overheat, on the basis of ratio of the contents of selected two of said components.

4,502,321

APPARATUS AND METHOD FOR MEASURING THE CONCENTRATION OF GASES

Matthew Zuckerman, Carmel, Calif., assignor to Capital Controls, Colmar, Pa.

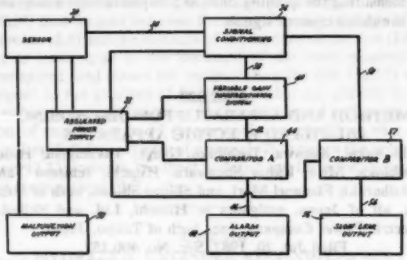
Division of Ser. No. 238,768, Feb. 27, 1981, Pat. No. 4,423,407. This application Mar. 21, 1983, Ser. No. 477,228

Int. Cl.³ G01N *27/12*

U.S. Cl. 73—23 **3 Claims**

1. Apparatus for detecting a selected gas comprising a sensor which is adapted to change electrical resistance in response to the presence of the selected gas and circuit means electrically interconnected with said sensor, said circuit means including means for generating a signal indicative of the rate of change of

said sensor resistance, and means for maintaining a predetermined signal level and means for providing an output signal



when said generated signal exceeds said predetermined signal level.

4,502,322

APPARATUS FOR DETECTING LEAKS IN STEAM RAISING BOILERS

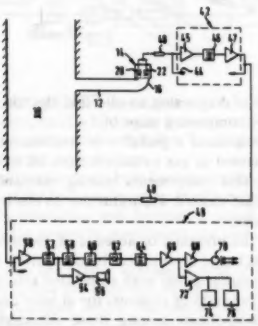
Brian A. Tero, Tonbridge, England, assignor to Lintvalve Electronic Systems Limited, London, England

Filed Oct. 28, 1983, Ser. No. 546,731

Claims priority, application United Kingdom, Nov. 5, 1982, 8231672

Int. Cl.³ G01M *3/08*

U.S. Cl. 73—40.5 A **6 Claims**



1. Apparatus for detecting the presence of a steam leak in a steam raising boiler comprising at least one long narrow listening tube leading from the boiler combustion space and provided at its end remote from said combustion space with an elbow, a microphone assembly sealed to the elbow for reception down the listening tube of noise in the combustion space, means for deriving and amplifying a signal from a microphone in said microphone assembly, and means responsive to said amplified signal for indicating the level of sound in said combustion space.

4,502,323

METHOD AND APPARATUS FOR PERFORMING A HYDRAULIC PRESSURE TEST ON A TUBE

Tosio Watase; Koichi Mori; Kazuo Sasaki; Katsumi Onizuka; Yuzo Yoshikawa, and Takeshi Fujita, all of Osaka, Japan, assignors to KK Yamamoto Sulatsu Kogyosho, Osaka, Japan

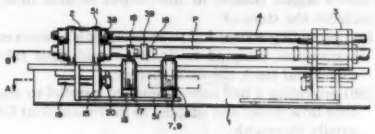
Filed Jun. 30, 1983, Ser. No. 509,514

Claims priority, application Japan, Jun. 30, 1982, 57-114392

Int. Cl.³ G01M *3/28*

U.S. Cl. 73—49.6 **6 Claims**

1. An apparatus for performing a hydraulic pressure test on a tube comprising a water tank, tube support means located in said water tank for lowering and raising a tube into and out of the water tank, a pair of valved end caps adapted to be inserted into opposite ends of said tube, end cap support means adapted to position said caps in alignment with opposite ends of said tube when said tubes are lowered into said water tank, end cap applying means adapted to insert said end cap into opposite ends of said tube in sealed relation thereto, hydraulic pressure application means adapted to be engaged with opposite ends of said valved end caps when said tube support means is raised to a position above the water tank for introducing water under high pressure through said valved end caps, and means associated with said hydraulic pressure means for removing said end



caps subsequent to the hydraulic pressure test, wherein said tube support means is comprised of a first supporting device adapted to receive a tube above said water tank and lower said tube into said water tank, a second supporting device being moveably mounted in said tank for supporting a tube in a lowered position within the tank for the application of end caps thereto and a second position above said water tank for carrying out the hydraulic pressure test and cam means associated with said first supporting device for automatically transferring a tube from said first supporting device to said second supporting device as said first supporting device lowers the tube into said water tank.

4,502,324

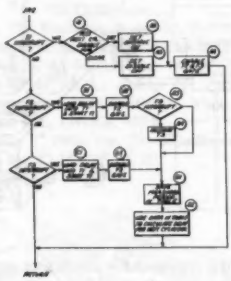
ENGINE ANALYZER POWER CHECK APPARATUS

Joseph A. Marino, Waukesha; Michael J. Kling, Mequon, both of Wis., and Sydney J. Roth, Largo, Fla., assignors to Bear Automotive Service Equipment Company, Milwaukee, Wis.

Filed Nov. 15, 1982, Ser. No. 441,425

Int. Cl.³ G01M *19/02, 15/00*

U.S. Cl. 73—117.3 **9 Claims**



1. An engine test apparatus for use in testing of a multicylinder internal combustion engine by selectively disabling cylinders of the engine while the engine is running to observe its influence on operation of the engine, the engine having an ignition circuit including an igniter for each cylinder, an ignition coil, circuit interrupter means which is periodically switched between a conductive and a nonconductive state to cause the ignition coil to generate a secondary voltage signal each time the circuit interrupter means is switched to the nonconductive state, and a distributor for sequentially applying each generated secondary voltage signal to the igniter of a

different cylinder in a predetermined sequence, the engine test apparatus comprising:

switching means for switching from a nonconductive to a conductive state in response to a switch control signal;

connection means for operatively connecting the switching means across the circuit interrupter means to cause the circuit interrupter means to be short-circuited each time the switching means is in its conductive state;

cylinder clock means for deriving from the engine a cylinder clock signal representative of sequential operation of the cylinders of the engine, the cylinder clock signal exhibiting a first signal transition each time the circuit interrupter means switches from its conductive to its nonconductive state;

cylinder counter means responsive to the cylinder clock signal for providing a cylinder count identifying a current cylinder in the sequence;

period measurement means responsive to the cylinder clock signal for measuring a time period for each cylinder;

first storage means for storing previously measured time periods for the cylinders;

time delay means for initiating a time delay in response to each first signal transition of the cylinder clock signal, the time delay having a duration which is determined as a function of and is shorter than a previously measured time period of the current cylinder, so that the time delay ends before the occurrence of the first signal transition corresponding to the next cylinder in the sequence;

second storage means for storing an indication for each cylinder of whether that cylinder is to be disabled by short-circuiting of the circuit interrupter means to prevent generation of a secondary voltage signal for the igniter corresponding to that cylinder;

means for providing the switch control signal at the end of the time delay if based upon the cylinder count and the stored indication, the next cylinder in the sequence is to be disabled.

4,502,325

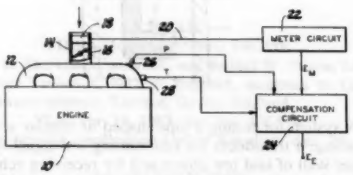
MEASUREMENT OF MASS AIRFLOW INTO AN ENGINE

Edward D. Klomp, Mt. Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 8, 1983, Ser. No. 530,429

Int. Cl.³ G01M *15/00*

U.S. Cl. 73—118 **4 Claims**



1. The method of measuring mass airflow into an engine through an intake plenum subject to air density changes in the plenum comprising the steps of:

measuring the mass airflow into the plenum,

determining the rate of air density change in the plenum, and

adjusting the airflow measurement by a function of the rate of air density change to compensate for air density transients, whereby the adjusted airflow measurement represents mass airflow into the engine.

4,502,326

FUEL INJECTION NOZZLE FOR INTERNAL COMBUSTION ENGINES

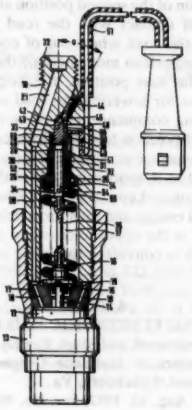
Bernhard Kaczynski, Waiblingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 11, 1983, Ser. No. 483,994

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1982, 3227989

Int. Cl.³ G01M *15/00*

U.S. Cl. 73—119 A **12 Claims**



1. An injection nozzle for internal combustion engines comprising a nozzle body having a valve seat, a spring for loading a valve needle which is arranged to pass through said seat, a valve needle, said nozzle body being further attached to a nozzle holder, said nozzle holder provided with a chamber for said loading spring and a stepped bore thereabove arranged to receive a coil core having a coil body and an associated induction coil, said valve needle being further provided with an armature and said armature further arranged to extend through said induction coil into said coil bore and means in said nozzle holder for axial adjustment of said coil core.

4,502,327

ROAD TESTING APPARATUS

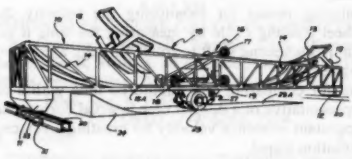
Stephen P. Scrivener, Glenbrook; Wallace D. Smith, Willoughby; Mark L. Mansell, Gymea, and Neville D. Campbell, Dundas, all of Australia, assignors to The Commissioner for Main Roads, Sydney, Australia

Filed May 5, 1983, Ser. No. 491,649

Claims priority, application Australia, May 6, 1982, PF3888

Int. Cl.³ G01N *19/00*

U.S. Cl. 73—146 **20 Claims**



1. Apparatus for testing a test portion of road pavement extending between first and second positions, the apparatus comprising:

(a) a support for carrying a test load,

(b) a hub for rotatably mounting a road wheel on the support,

(c) mounting means for displaceably mounting and guiding the support for displacement generally between said first and second positions,

(d) means for moving the support forwardly from the first position to the second position with the road wheel rolling along the test portion, and means for returning the support from the second position to the first position, and characterised by,

(e) height control means for lifting the hub when the support is in the region of the second position and holding the road wheel out of contact with the road pavement and for maintaining the road wheel out of contact with the test portion during return movement of the support from the second to the first position, the height control means having means for lowering the road wheel onto the test portion during commencement of motion of the support from the first position towards the second position, and

(f) energy conversion means for decelerating the support and test load as it approaches either the first position or second position and converting the kinetic energy thereof into potential energy and then for accelerating the support and test load in the opposite direction using said potential energy which is converted to kinetic energy.

4,502,328

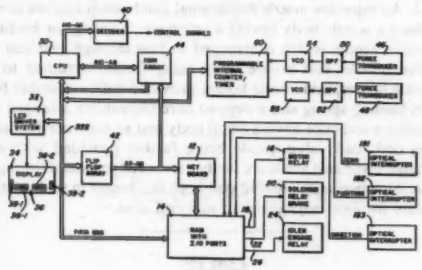
FREE SPINNING ELECTRONIC WHEEL BALANCER

John F. Wood, Brentwood, and Mark Van Dyke, Nashville, both of Tenn., assignors to Hofmann Corporation Automotive Service Equipment, Lynchburg, Va.

Filed Aug. 10, 1982, Ser. No. 406,874

Int. Cl.³ G01M *1/22*

U.S. Cl. 73—462 **10 Claims**



1. Apparatus for measuring unbalance in a vehicle wheel, said apparatus comprising:

a drive shaft for carrying the vehicle wheel to be balanced;

means for mounting the wheel to the drive shaft;

detecting means for detecting at least one force associated with the unbalance condition of the wheel;

means for causing said drive shaft to rotate in a freewheeling state;

monitoring means for monitoring the velocity during a wheel rotating cycle by measuring the time it takes for said freewheeling shaft to rotate through a predetermined angle;

means for comparing said monitored time with a constant representative of a desired time interval corresponding to a constant reference velocity for creating a velocity compensation signal;

measuring means for measuring the angular location of the unbalance in said vehicle wheel; and

compensating means receiving said velocity compensation signal and the unbalance as determined by said detecting means for producing a velocity-compensated output signal indicative of the unbalance in said vehicle wheel.

4,502,329

METHOD FOR CHECKING INSULATIVE CONDITION OF INSULATED WINDINGS USED IN ELECTRICAL APPLIANCES

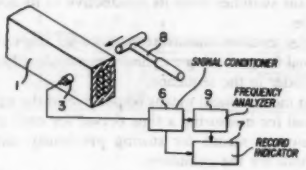
Tokio Fukunaga; Akemi Futakawa, and Mataichiro Kiso, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1983, Ser. No. 477,366

Claims priority, application Japan, Apr. 7, 1982, 57-59191; Apr. 14, 1982, 57-63510

Int. Cl.³ G01H *1/06*; G01M *7/00*

U.S. Cl. 73—573 **6 Claims**



1. A method for testing the condition of the insulation in an insulated winding, comprising the steps of:

applying an external mechanical force to said insulated winding so as to impart a vibration having a frequency in said insulated winding;

measuring said frequency in said insulated winding;

measuring the amplitude of said vibration in said insulated winding with an accelerometer to produce an output;

detecting a change in said frequency with respect to a change in said accelerometer output;

determining the condition of said insulation based on said change in frequency.

4,502,330

PULSE-ECHO SYSTEM FOR MEASURING PARAMETERS OF A TUBULAR TEST OBJECT

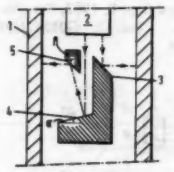
Wilhelmus M. J. Haesen, Dordrecht, Netherlands, assignor to B.V. Neratoom, The Hague, Netherlands

Filed Sep. 29, 1982, Ser. No. 427,570

Claims priority, application Netherlands, Oct. 5, 1981, 8104526

Int. Cl.³ G01N *29/00*

U.S. Cl. 73—623 **6 Claims**



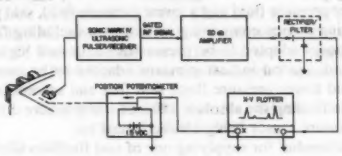
1. A system for testing a pipe-shaped or tubular set object, comprising: a transducer for transmitting test signal waves to an inner wall of said test object and for receiving echo signal waves reflected from the inner wall, said transducer having a main axis; a first reflector disposed opposite to said transducer and the inner wall for causing test signal waves and echo signal waves to propagate in a predetermined sectional plane of said test object along a first transmission path between said transducer and said test object, a second reflector for causing test signal waves and echo signal waves to propagate along a second transmission path between said transducer and said inner wall; and a third reflector facing away from said transducer and disposed in said second transmission path between said second reflector and said inner wall; said second reflector

being disposed at such an angle relative to the main axis of the transducer and to said third reflector that said second transmission path is composed of at least three rectilinear segments; the length of said second transmission path being sufficiently greater than the length of said first transmission path that the difference between the time intervals of a test signal wave transmitted to the inner wall and a first echo signal wave complex received from said inner wall by said transducer via said first transmission path, and a second echo signal wave complex received from said inner wall by said transducer via said second transmission path, is of such magnitude that said two echo signal wave complexes have no influence on each other.

4,502,331
METHOD FOR ULTRASONIC INSPECTION OF TURBINE DISC RIMS

Gurvinder P. Singh, and Richard A. Cervantes, both of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Filed Sep. 14, 1983, Ser. No. 532,159
Int. Cl.³ G01N *29/04*
U.S. Cl. 73—627 **6 Claims**



4. A method of detecting cracks in a turbine disc rim having a web area and an adjacent area of integral, serrated steeples with or without turbine blades mounted therein, comprising the steps of:

producing an ultrasonic beam of shear waves traveling in a radial direction;

skewing the beam at an acute angle relative to a line normal to the bottom of a steeple;

directing waves of the skewed ultrasonic beam into the steeple root area from a location on the disc rim web area;

scanning along the disc rim web with the skewed beam;

receiving reflected waves as the beam is scanned and producing signals indicative thereof;

continuously recording the reflected wave signals as the disc rim is scanned to produce a record thereof;

establishing predetermined time windows on the record based on the time-of-flight to a predetermined, suspected crack location; and

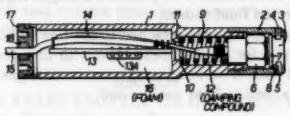
determining the presence of recorded signals within the time windows.

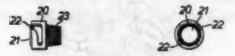
4,502,332
VIBRATION SENSING PROBE

Richard B. Sheridan, Colebrook, and Robert W. Bogue, Lamerton near Tavistock, both of England, assignors to Gabriel Microwave Systems, Limited, Devon, England

Filed Apr. 18, 1983, Ser. No. 486,974
Claims priority, application United Kingdom, Apr. 26, 1982, 8212057
Int. Cl.³ G01N *29/00*
U.S. Cl. 73—661 **6 Claims**

1. A detachable probe for attachment to a pick-up stud attached to a machine to produce electrical signals in response to the vibrations of the part of the machine to which the stud is attached, the probe including a tubular portion having an open end shaped for mechanical engagement to the stud, an accelerometer located within the tubular portion and retained therein by abutment means adjacent the open end and spring means urging the accelerometer towards the open end and connections for conveying the electrical output signals from the accelerometer, the open end of the probe and the stud being so shaped that mechanical engagement of the probe to the stud is effected by an initial axial movement of the tubular portion bringing the accelerometer into direct contact with the



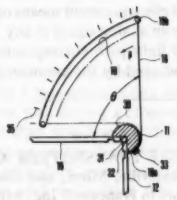


stud followed by a locking operation to hold the probe on the stud, wherein when the probe is in engagement with the stud the accelerometer is held clear of the abutment means by the stud against which it is pressed by the spring means.

4,502,333
THREE FORCE BALANCED MECHANISM

Tatsuhide Shiga; Mikio Tanaka; Yoshikuni Doki; Yoshihiro Tsuruoka, and Masatoshi Fujiwara, all of Kanagawa, Japan, assignors to Yomatako-Honeywell Co. Ltd., Tokyo, Japan

Filed Sep. 27, 1983, Ser. No. 536,285
Claims priority, application Japan, Sep. 29, 1982, 57-170174
Int. Cl.³ G01L *7/08*
U.S. Cl. 73—701 **4 Claims**



1. In a three force balanced mechanism of the type comprising a floating pivot, an input force transmitting member, a feedback force transmitting member, the ends of said input force transmitting member and said feedback force transmitting member being connected to said floating pivot; and

a flexible span setting member with one end secured to said floating pivot, said span setting member being inclined with respect to said input force transmitting member,

the improvement wherein said floating pivot has a cylindrical surface intersecting said two force transmitting members and one end of said span setting member is wound about or unwound from said cylindrical surface.

4,502,334
COMBINED PRESSURE GAUGE-TRANSMITTER

Joseph E. Gorgens, Trumbull; Randall Goff, Weston, and Stephen G. Sardi, Milford, all of Conn., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 4, 1983, Ser. No. 520,353
Int. Cl.³ G01D *5/34*; G01L *7/04*
U.S. Cl. 73—705 **8 Claims**

1. A combination pressure gauge-transmitter for providing indications of pressure values comprising:

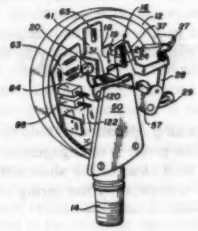
(a) a gauge case;

(b) a Bourdon tube within said case of selected configuration having a fixed end connected to an inlet socket adapted for connection to a source of fluid pressure and a free end

adapted for displacement in response to changes in values of pressure incurred by the connected fluid source;

(c) a pointer operatively connected to the free end of said Bourdon tube for displacement therewith relative to a dial plate in correlation to pressure changes incurred by the connected fluid source;

(d) a vane operatively attached to the free end of said Bourdon tube for displacement therewith in a predetermined travel path in correlation to pressure changes incurred by the connected fluid source; and



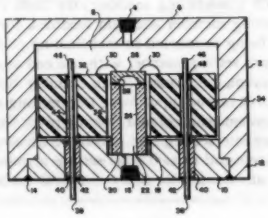
(e) a photo-optic transmitter geometrically positioned within the operative tube arc of said Bourdon tube and including a pair of photosensors, a photo emitter arranged to define a light path projecting toward said photosensors in a direction transverse to the travel path of said vane for said light path to incur gradual increased and decreased interruption by the position of said vane in the course of its displacement and electric circuit means operative continuously to generate an analog signal at any given position of said vane in said light path corresponding to a value of pressure being incurred by the connected fluid source.

4,502,335

FLUID PRESSURE TRANSMITTER ASSEMBLY

David B. Wamstad, Roseville, Minn., and Douglas W. Wilda, Ambler, Pa., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 4, 1983, Ser. No. 491,613
Int. Cl.³ G01L *9/06*
U.S. Cl. 73—721 **10 Claims**



1. A pressure transmitter comprising

a housing means defining an internal volume,

a pressure sensor means mounted within said internal volume of said housing means,

a spacer within said internal volume of said housing means and

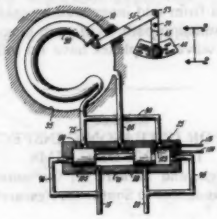
support means for supporting said spacer as a free floating body within said housing and spaced from said sensor means and all internal surfaces defining said internal volume of said housing means with a support connection between said support means means and said spacer at one end surface of said spacer.

4,502,336

PRESSURE MEASURING DEVICE

Carl S. Dudash, Enfield, and Brian G. Donnelly, West Suffield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 14, 1982, Ser. No. 417,932
Int. Cl.³ G01L *7/04*
U.S. Cl. 73—736 **6 Claims**



1. A device for measuring the difference in pressure between a higher pressure fluid and a lower pressure fluid, said pressure measuring device comprising an indicator including first indicator means adapted to be pressurized with said higher pressure fluid, second indicator means adapted to be pressurized with said lower pressure fluid, said first and second indicator means indicating the absolute value of said pressure difference, said pressure sensor being characterized by:

a first conduit for supplying one of said fluids to said indicator;

a second conduit for supplying the other of said fluids to said indicator; and

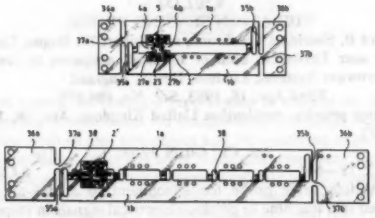
valve means in fluid communication with said first and second indicator means and with said first and second conduits, said valve means being actuable by said pressure difference between said first and second fluids to consistently place said first indicator means in fluid communication with said higher pressure fluid and said second indicator means in fluid communication with said lower pressure fluid.

4,502,337

FATIGUE DAMAGE INDICATOR

Michel Archer, La Celle-St. Cloud, France, assignor to Societe Anonyme S.T.A.S. Societe Technique d'Accessoires Specialises, Sartrouville, France

Filed Mar. 30, 1983, Ser. No. 480,403
Claims priority, application France, Mar. 30, 1982, 82 05833
Int. Cl.³ G01N *19/08*
U.S. Cl. 73—762 **4 Claims**



1. In a fatigue damage indicator for a mechanical member subjected to repetitive stress, comprising two thick elements which are spaced from one another and are connected one to the other by a thin plate formed with a slot and at least one pair of free opposite edges, the two elements being so connected with the mechanical member or fixed to the latter so that they

are displaceable relative to one another in a plane parallel to the plane of the thin plate, the thick elements being disposed so as to be separated from one another in a direction substantially perpendicular to their direction of relative displacement by such stress, the thin plate being placed under shear force in its plane by such relative displacement, the slot of the thin plate extending from one of the edges of the thin plate in the said direction and terminating short of the opposite edge in a blind end of the slot having two corners so that, with application of stress, two cracks develop at corners of the bottom of the crack and are propagated progressively in the thin plate towards an opposite edge of the thin plate so that said cracks meet cracks propagating generally in a direction away from said opposite edge to detach, or substantially detach, a central zone of the thin plate delimited by said cracks,

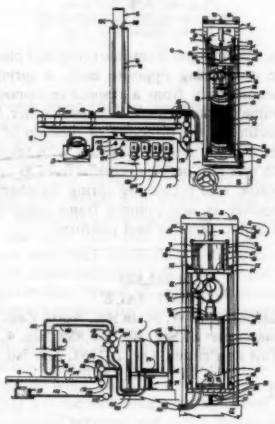
the improvement wherein the thick elements of the fatigue damage indicator are connected to each other not only by said thin plate but in addition by two narrow, elongated struts disposed on either side of the thin plate and directed perpendicularly to the axis of one or the two slots in this thin plate.

4,502,338

TRIAXIAL APPARATUS FOR TESTING PARTICULATE MATERIAL AND METHOD OF USING THE SAME

David L. O. Smith, and Robert A. Lohnes, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 16, 1983, Ser. No. 494,801
Int. Cl.³ G01N *3/08*
U.S. Cl. 73—819 **19 Claims**



11. A method of determining stress histories of a particulate material sample to be tested in a tiraxial testing apparatus comprising a frame, an airtight rigid cylindrical outer cell mounted on said frame, an airtight flexible cylindrical inner specimen cell mounted concentrically within said outer cell, a pressure measuring means adapted to measure the pressure in said inner and outer cells, a volume measuring means adapted to measure volume changes within said inner cell, a piston means positioned within said outer cell and adapted to apply compressive and tensile forces on said inner cell, a piston actuation means, and a control means for regulating the quantity of a compressible fluid within said inner and outer cells such that volume and pressure changes within said cells can be controlled, said method comprising:

loading said material to be tested into said inner cell, coupling said inner cell to said volume measuring means, activating said piston actuation means,

maintaining constant lateral stress on said material in said inner cell by regulating the quantity of said compressible fluid within said inner cell,

further increasing said force on said inner cell until said material fails,

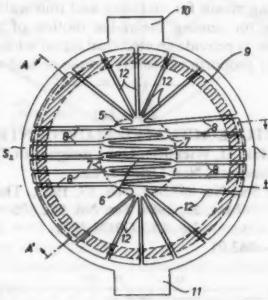
measuring the volume change of said material in said inner cell with said volume measuring means from initial loading to failure of said material.

4,502,339

THERMAL PULSE EMITTER OR DETECTOR ELEMENT

Klaus Horn, Brunswick, Fed. Rep. of Germany, assignor to Viscotherm Aktiengesellschaft, Hinteregg, Switzerland

Filed Sep. 14, 1982, Ser. No. 418,063
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1982, 3208145
Int. Cl.³ G01F *1/68, 1/70*
U.S. Cl. 73—861.05 **5 Claims**



1. An emitting or detecting element for an in-line measuring instrument having a measuring casing with an internal diameter defining a flow wall having a cross-section and an external diameter greater than said internal diameter, said measuring instrument operating on the thermopulse-injection and transit time measuring procedure, comprising:

(a) a resistance path comprising first and second ends and plurally meandering coil means, said resistance path having a cross-section less than said flow cross-section;

(b) reversing points on said coil means;

(c) holding tape means having a first end connecting said reversing points and a second end connecting said flow wall;

(d) electrode lead means extending from said flow wall and connecting said first and second ends of said resistance path; and

(e) a closed peripheral rim having an internal diameter greater than said external diameter of said measuring casing with said second ends of said holding tape means and said electrode lead means connected thereto.

4,502,340

TORQUE SENSOR FOR SHAFTS

Vernon D. Gebben, Oklahoma City, Okla., assignor to International Harvester Company, Chicago, Ill.

Filed Feb. 15, 1983, Ser. No. 466,470
Int. Cl.³ G01L *3/10*
U.S. Cl. 73—862.33 **12 Claims**

1. Apparatus for measuring the torque of a slowly rotating shaft, comprising:

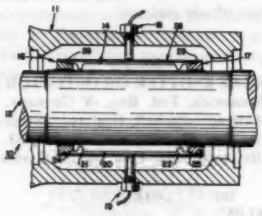
(a) a thin-wall cylinder disposed coaxially along said shaft,

(b) a pair of collars, each collar having an inwardly facing reduced diameter step portion and wherein said open ends of said thin-wall cylinders are mounted on said reduced diameter step portion,

(c) resilient means interposed between said pair of collars

and the ends of said cylinder for minimizing stresses in the axial direction,

(d) shell means for enclosing said thin-wall cylinder and sealing said cylinder from the lubricant for said shaft,



(e) exciting means for vibrating said thin-wall cylinder, and

(f) means for sensing the radial motion of the oscillating cylinder to provide an electrical signal whose frequency is directly proportional to the torque of said shaft.

4,502,341

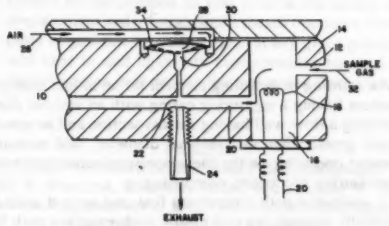
TEMPERATURE-ACTUATED FLOW CONTROL DEVICE

George R. Hall, II, Wickliffe, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Division of Ser. No. 467,554, Feb. 17, 1983,. This application Mar. 23, 1984, Ser. No. 592,503

Int. Cl.³ G01N *1/24*

U.S. Cl. 73—863.01 **5 Claims**



1. A gas sampling device comprising:

means defining a gas sampling chamber having a gas sensor in said chamber;

a sample gas inlet connected into said gas sampling chamber;

means for moving sample gas between said gas sampling chamber and said exhaust line including a switching chamber located therebetween, a bi-metallic element disposed in said switching chamber and being flexible and responsive to temperature change so that in a first flexed position it stops the flow between said gas sampling chamber and said exhaust line while allowing flow therebetween in a second flexed position; and wherein

said switching chamber is larger than said bi-metallic element to make said element free-floating therein and has a pair of symmetrically located counterbored areas at opposite ends of said switching chamber to allow the symmetrical flow of fluid past said bi-metallic element.

4,502,342

PULSED DRIVE MEANS FOR SHAKER

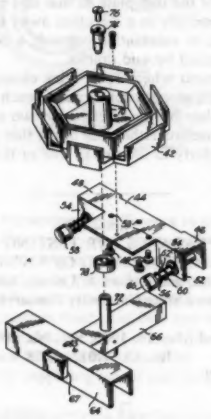
Jack A. Kraft, New Hyde Park, and Harold D. Kraft, Flushing, both of N.Y., assignors to Templeton Coal Company, Inc., Terre Haute, Ind.

Filed Feb. 16, 1982, Ser. No. 349,033

Int. Cl.³ F16H *21/44*; B07B *1/42*; B01F *11/00*

U.S. Cl. 74—26 **4 Claims**

1. A pulsed drive means for a platform carrying containers holding liquid to be mixed, said drive means comprising a motor providing a continuous rotary motion to the motor shaft, coupling means connected to said motor shaft converting said rotary motion to an oscillatory sinusoidal motion, said coupling means connected to an elongated plunger frame to provide said oscillatory sinusoidal motion to said plunger frame, said coupling means including a driven arm, a drive shaft coupled to an end of said driven arm, and being driven in an oscillatory rotary motion by said driven arm, said plunger frame being connected to said drive shaft to be rotatably



driven thereby, said plunger frame carrying said platform, said plunger frame comprising opposite ends, a spring member attached perpendicularly from a respective opposite end of said plunger frame extending parallel to each other, said spring members projecting in the direction of rotation of said drive shaft, a bracket member fixedly attached with respect to said drive shaft such that said bracket remains fixed as said plunger frame reciprocates, said projecting spring members bumping against said bracket as said plunger frame reciprocates and providing said pulsed drive to said platform.

4,502,343

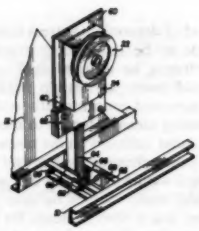
PUMP JACK

Alan W. Dingfelder, 10299 W. Main Rd., North East, Pa. 16428

Continuation-in-part of Ser. No. 183,889, Sep. 4, 1980, abandoned. This application Apr. 2, 1981, Ser. No. 250,100

Int. Cl.³ F04B *47/02*

U.S. Cl. 74—41 **2 Claims**



1. A pump jack comprising:

a frame;

a sampson post structure mounted on said frame;

a walking beam pivotally connected to said sampson post structure via a sampson pivot;

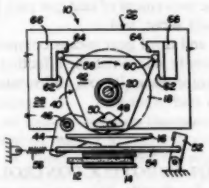
a crank bearing securely mounted to said sampson post structure;
a crank rotatably coupled to said crank bearing;
a speed reducer non-rotatably coupled to said crank and laterally displaced with respect to said walking beam;
a metal post securely fastened to said speed reducer and extending substantially vertically to said frame;
elastic mounts secured to said frame for receiving said metal post;
driving means connected to said speed reducer to rotate said crank;
and
a pitman rod rotatably connected at one end to said crank and connected at the opposite end to said walking beam via a pitman pivot.

4,502,344

SELF-ENERGIZING FRICTION DRIVE TRANSMISSION

Alan G. Klug, Oshkosh, Wis., assignor to Ingersoll Equipment Co., Inc., Winnecone, Wis.

Filed Jun. 7, 1982, Ser. No. 386,121
Int. Cl.³ F16H *15/08*
U.S. Cl. 74—194 **1 Claim**



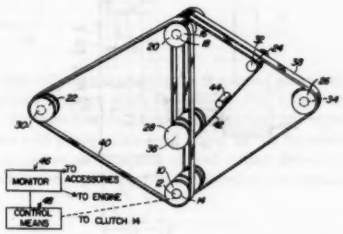
1. A self-energizing friction disc transmission comprising:
a drive disc rotatably mounted on a generally vertical axis, power means for rotating said drive disc, a driven friction disc rotatable on a drive shaft above said drive disc, and said driven disc having a periphery that is selectively movable into contact with a face on said drive disc;
movable means for lowering said driven disc into contact with said drive disc and for permitting some slippage between said discs when they initially contact and said movable means including a floating member connected to said driven disc drive shaft and clutch means connected to said floating member for raising and lowering said floating member and driven disc relative to said drive disc;
means for applying an additional force between said driven and drive discs after they initially contact to overcome slippage between said discs under load, said means for applying a force including a spring biased actuator member connected between said clutch means and said floating member, said actuator member including a pin means that is movable within a slot in said floating member, said clutch means being depressed for overcoming the spring bias on said actuator member such that said pin means engages one edge of said floating member slot thereby raising said floating member and said driven disc away from said drive disc, said clutch means being partially released until said pin means reaches an intermediate position within said floating plate slot for permitting initial contact and slippage between said discs, and said clutch means being completely released such that said pin means engages on opposite edge of said floating member slot in response to the spring bias on said actuator member thereby providing an additional force between said driven and drive discs after they initially contact; and
said floating member including opposed guide pins which are engageable with guide brackets to limit the vertical movement of said floating member wherein said floating member being rotated in opposite directions depending upon the direction of rotation of said driven disc upon initial contact with said drive disc and one of said guide pins moving into engagement with a respective guide bracket for balancing the vertical force component between said discs.

4,502,345

ACCESSORY DRIVE SYSTEM

Roger P. Butterfield, Freeville, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 7, 1980, Ser. No. 119,290
Int. Cl.³ F16H *5/42, 5/60*
U.S. Cl. 74—336 B **1 Claim**



1. A two speed ratio drive arrangement for driving accessories associated with an internal combustion engine of an automotive vehicle, comprising:
a crankshaft connected to and driven by said engine at a first speed range;
a pulley on said crankshaft;
a second shaft rotatable at a second and lower speed range;
a pulley on said second shaft;
one or more accessories for said vehicle, each having a shaft and a driving pulley;
a belt connecting said accessory pulleys to said crankshaft pulley and to said second shaft pulley;
an electro-magnetic clutch adapted to be energized and de-energized for connecting and disconnecting said crankshaft and said pulley thereon;
a second overrunning one-way clutch for connecting and disconnecting said second shaft and the pulley thereon;
said second shaft and said pulley thereon being normally connected and driving accessory pulleys and overrunning when said electro-magnetic clutch is energized;
said crankshaft and said pulley thereon driving accessory pulleys when said electro-magnetic clutch is energized; and
means for energizing said electro-magnetic clutch;
said last-named means being so constructed and arranged to be controllable by changes in operating characteristics of said accessories and of said engine.

4,502,346

VARIABLE MECHANICAL ADVANTAGE TORQUE ARM

Joseph D. Reynolds, Climax, Mich., assignor to Eaton Corporation, Cleveland, Ohio

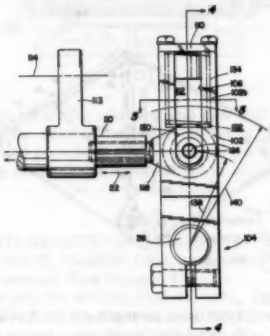
Filed Oct. 22, 1982, Ser. No. 436,137
Int. Cl.³ G05G *9/18, 7/04;* F16D *23/06*
U.S. Cl. 74—339 **10 Claims**

1. A variable mechanical advantage/variable effective length torque arm assembly for rotating a shaft about a fixed axis of rotation against a resistance, said assembly comprising:
a relatively rigid body having a first and a second axial end, said body defining an axially extending slot defined by substantially parallel straight axially extending side walls extending from a point spaced from said first end toward said second end;
a first mounting means fixed to said body adjacent to said

first end thereof for pivotably receiving the end of a control rod selectively axially movable along an axis substantially perpendicular to said fixed axis of rotation, said first mounting means defining a pivot axis substantially parallel to said fixed axis of rotation and spaced therefrom;

a second mounting means comprising a fitting fixed to said shaft having two parallel substantially flat surfaces slidably but nonrotatably engageable with said slot side walls for slidably but nonrotationally fixing said shaft to said body;

said second mounting means slidably received in said slot for



defining a first effective length of said torque arm assembly when said second mounting means is located in a position closest to said first end and for defining a second effective length of said torque arm assembly when said second mounting means is located in a position most distant from said first end whereby a given axial movement of said control rod will result in a rotational movement of said shaft inversely related to the magnitude of separation of said first and second mounting means, and

resilient biasing means resiliently biasing said other of said first and second mounting means to a position in said slot closest to said first end.

4,502,347

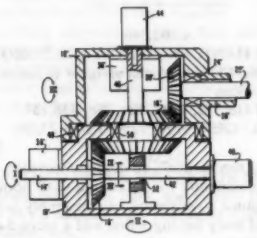
ROBOTIC WRIST

George W. Norris, Wilkins Township, Allegheny County; Richard M. Kobuck, Delmont; William J. Varley, Export; Arthur F. Jacobs, Monroeville, and Herbert E. Ferree, Hempfield Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 21, 1982, Ser. No. 420,669

Int. Cl.³ F16H *1/20*

U.S. Cl. 74—447 **9 Claims**



1. In a robotic manipulator wrist of the type in which one part of the wrist carries an end effector shaft rotatable about the end effector axis, and said one part of said wrist is rotatable relative to an other part of said wrist about another axis, the improvement comprising:

first gear means in said wrist and disposed with its axis of rotation coincident with said another axis, said first gear means being mounted in rotatable relation to said one part of said wrist;

second gear means in said wrist and affixed for rotation with said end effector shaft and in meshing relation with said first gear means;

third gear means in said wrist and in meshing relation with said first gear means and driven from a remote source;

engageable and disengageable brake means carried by said wrist and having one condition preventing relative movement between said second gear means and said first gear means while permitting relative rotation between said one part and said other part of said wrist, whereby rotation of said third gear means effects rotation of said one part relative to said other part of said wrist without rotation of said end effector shaft about its axis, and another condition preventing relative rotation between said one part and said other part of said wrist while permitting relative movement between said second gear means and said first gear means whereby rotation of said third gear means effects rotation of said end effector shaft about its axis without relative movement of said one part relative to said other part of said wrist; and

said first, second and third gear means comprising the totality of gear means in said wrist for effecting both rotation of said end effector about its axis and rotation of said one part relative to said other part.

4,502,348

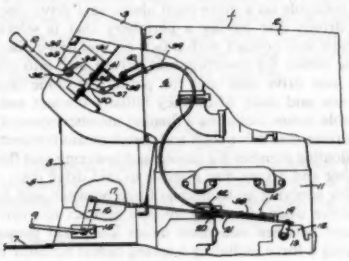
HAND AND FOOT THROTTLE CONTROL LINKAGE

Frederick C. Bauer, Franksville, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 20, 1982, Ser. No. 451,607

Int. Cl.³ G05G *11/00, 5/16*

U.S. Cl. 74—482 **10 Claims**



1. A throttle control for an engine on a motor vehicle comprising, a pedal and lever supporting structure between an operator station and an engine compartment, a fuel feeding device having a throttle arm for metering fuel to the engine in said engine compartment, an accelerator pedal pivotally mounted on said pedal and lever supporting structure having a foot operated arm at said operator station and a fuel control arm, a push rod pivotally connected to said control arm and said throttle arm and defining an elongated slot, a hand throttle lever pivotally mounted on said pedal and lever supporting structure, a pin means in said slot for operating the said push rod and throttle arm, a throttle operating member pivotally connected between said hand throttle lever and said pin means for operating said push rod and said throttle arm, a return spring connected between said pin means and said push rod biasing said pin means to one end of said slot and operating as a return spring for said push rod and said accelerator pedal, a stop means for said hand throttle lever on said pedal and lever

supporting structure providing positioning of said hand throttle lever when operating said throttle.

4,502,349

METHOD OF REALIZATION OF HIGH SPEED ROTOR AND ROTOR OBTAINED THEREBY

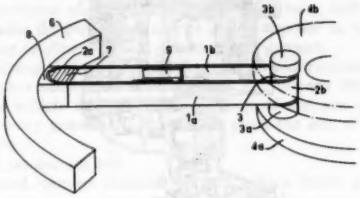
Henri Abiven, Oinville, Meulan; André Beheydt, Jouy en Josas; Michel Clermont, Guernes; Maurice Delattre, Paris, and Pierre Poubeau, Le Peco, all of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Apr. 9, 1982, Ser. No. 367,124

Claims priority, application France, Apr. 14, 1981, 81 07465

Int. Cl.³ G05G *1/00*

U.S. Cl. 74—572 **13 Claims**



1. A high speed rotor of a type applicable for use with a flywheel comprising

a hub having an axis for rotation therearound,

a rim centered with respect to said hub and having an inner side, pairs of opposite connecting arms with identical elongation characteristics each in the form of an elongated loop connecting said rim to said hub and centering said rim with respect to said hub, said arms glued to said rim at the inner side thereof,

said arms each having rectilinear portions forming sides of each said loop and having an inner end connected to said hub and an outer end connected to said rim,

a pair of identical masses included within said loops at said outer ends of opposite arms in each pair of opposite arms to provide elongation of rectilinear portions of said loop under the effect of centrifugal force compatible with increase in radius of said rim when said rotor is rotated to ensure that said arms keep being pressed against inner side of said rim,

said hub having central circular means to center and maintain each said loop against centrifugal force with each said loop connected to said central circular means,

said rectilinear portions of said loops being thin plates, and

each of said loops including said thin plates joined at least at their ends near said hub through a rounded element of elongated form on at least inner end of said arm, said arm having a longitudinal symmetrical plane containing the rotational axis of said hub.

4,502,350

PUMP DRIVE MECHANISM

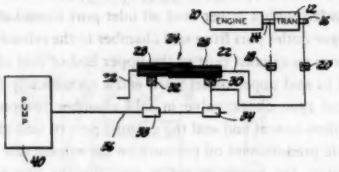
James C. Polak, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 6, 1983, Ser. No. 539,484

Int. Cl.³ F16H *47/00*

U.S. Cl. 74—730 **2 Claims**

1. A hydraulic pump drive for use with a transmission mechanism having an engine driven member and an output driven member, said pump drive comprising; a pump drive shaft drivingly connected to a hydraulic pump; a pair of input drive means each including a one-way drive mechanism operatively connected with said pump drive shaft; output drive gear means drivingly connected to the output driven member of said transmission and to one of the input drive means; differential gear means including a carrier member, and intermeshing pinion gear means rotatably supported on said carrier member; input drive gear means drivingly connected to said carrier and to the engine driven member whereby said carrier is rotated at the same speed as said engine driven member, the other of said input drive means and said pump drive shaft being driven



through said differential gear means at a speed greater than the engine driven member when the transmission output speed is less than the transmission input speed and said one input drive means and said pump drive shaft being driven by said output drive gear means at the speed of said output driven member when such speed is greater than the speed of the engine driven member.

4,502,351

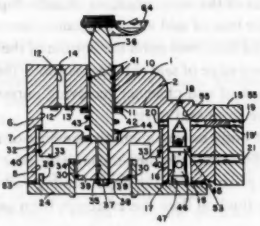
THIRD ACCUMULATOR CHECK VALVE

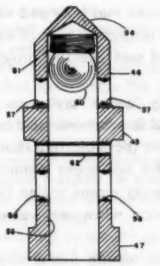
Guy W. Gates, 2627 Lofty View Dr., Torrance, Calif. 90505; James F. Bates, Rte. 3, Box 240, Cherokee, Ala. 35616; John F. Larsen, 1414 W. 11400 South, South Jordan, Utah 84065, and Benjamin F. Law, 103 S. Atlanta Ave., Sheffield, Ala. 35660

Filed Aug. 8, 1983, Ser. No. 520,119

Int. Cl.³ F16K *11/10*

U.S. Cl. 74—753 **10 Claims**





1. In a hydramatic automatic transmission system for motor vehicles of the type having a gear shift actuated by fluid operated clutches in conjunction with an intermediate brake band applied and released as activated by the thrust thereon and

withdrawal therefrom, respectively, of the shaft of a servo piston of a hydraulically operated intermediate servo cylinder, said servo cylinder being juxtaposed and serviced selectively with drive oil through flow controls to the lower apply side of said piston, and through controls to the upper release side of said piston by regulation of oil flow to said side of the piston through a vertical cylindrical accumulator check valve chamber provided with a lower feed oil inlet port to said chamber and a upper outlet port from said chamber to the release side of said piston, an exhaust port in the upper end of said chamber adjacent to said upper outlet port, and a reciprocally floating cylindrical type check valve in said chamber responsive to inlet oil flow to seat and seal the exhaust port of said chamber to provide predominant oil pressure on the release side of said servo piston, the improvement in said floating check valve which comprises:

a check valve positioned in said valve chamber having

a lengthwise body configurated to conform to the shape of said chamber and reciprocate upwardly and downwardly therein responsive to changes in feed oil pressure to contact the upper and lower ends of said chamber;

the upper end of said valve body being correspondingly shaped to seat on the abutting surfaces of said exhaust port in occlusive contact with said port when the valve is in its uppermost position;

the lower end of said valve body being provided with a laterally projecting base of size such as to be movably disposed in sufficient displacement from the sides of the valve chamber to allow free fluid flow therebetween as such valve reciprocates and rests in its lowermost position on the bottom of said chamber;

the intermediate section of said valve body having a laterally projecting shoulder sized in movable displacement from the sides of the valve chamber located disposed upwardly from the base of said valve a distance therealong such that when the base rests upon the bottom of the valve chamber the lower edge of said shoulder is above the lower feed oil inlet port of said chamber receiving unrestricted oil flow pressure from said port;

said valve body having a lengthwise bore of relatively large inside diameter extending through the base of said body to a point proximate to the upper seating end of said body to receive fluid oil flow therethrough from said valve chamber;

said valve body having a lower communicating passage for oil flow between said bore and valve chamber disposed between the projecting base of the valve body and the lower side of said laterally projecting shoulder of the valve body;

said valve body further having an upper communicating passage for oil flow between said bore and valve chamber disposed above the projecting shoulder of said body;

closure means for said upper communicating oil flow passage with biasing means urging the same in a normally closed condition when said valve is not in the seated mode;

said closure and biasing means responsive to modulated increases in fluid pressure through the lower end of said bore, and applied to the sides of said valve, to first urge said valve upwardly into the seated position and then open said upper flow passage to allow the outward flow of fluid under pressure to the outlet port of said valve chamber.

4,502,352

INFINITELY VARIABLE TRANSMISSION FOR A VEHICLE

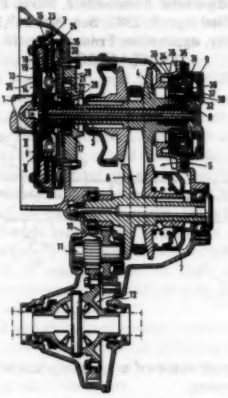
Eugen Svab, Cologne, Fed. Rep. of Germany, assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 16, 1982, Ser. No. 450,171

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1982, 3202692

Int. Cl.³ F16H *37/00, 37/08;* F16D *25/00*

U.S. Cl. 74—689 **4 Claims**



1. A continuously variable power transmission mechanism adapted to delivery driving torque from an internal combustion engine to a driven shaft comprising:

an input shaft arranged coaxially with respect to said engine;

a start-up clutch adapted to connect said engine to said input shaft;

a primary sleeve shaft mounted for rotation about said input shaft;

a drive pulley connected to said primary sleeve shaft;

planetary gearing connecting drivably said input shaft and said primary sleeve shaft including a reversing gearset with a sun gear, a ring gear, a planet pinion carrier and compound plane pinions journalled on said carrier, said planet pinions having two engageable sets, the pinions of one set engaging said ring gear and the pinions of the other set engaging said sun gear;

clutch and brake means for selectively anchoring said ring gear and for connecting said carrier and ring gear together to effect forward drive and reverse drive;

said start-up clutch comprising an annular piston located within an annular cylinder and defining therewith a pressure chamber, a friction disc having friction surfaces, said friction disc being positioned between an annular friction surface of said start-up clutch and said piston;

said start-up clutch annular cylinder comprising a pair of radially disposed wall members in abutting side-by-side relationship, and radial grooves formed in one of said wall member to define radial fluid pressure distribution passages extending to said pressure chamber.

4,502,353

CARRIER BRAKED FORWARD AND REVERSE PLANETARY TRANSMISSION

Gaston Beaudoin, 241 St. Damase, Drummondville, Quebec, Canada (J2B 6J2)

Filed Jan. 26, 1983, Ser. No. 461,198

Int. Cl.³ F16H *3/44, 37/00;* B60K *20/02*

U.S. Cl. 74—792 **8 Claims**

1. A gear transmission system particularly for a motor vehicle having a frame, said system comprising:

a shaft assembly made up of a hollow cylindrical outer driving shaft and a cylindrical inner driven shaft mounted coaxially with an in said driving shaft to be driven thereby; said driven shaft extending out of said driving shaft at both ends thereof;

means integral with one end of said driven shaft defining an internal gear circumscribing said shafts;

a sun gear intergral with said driving shaft and located within said internal gear;

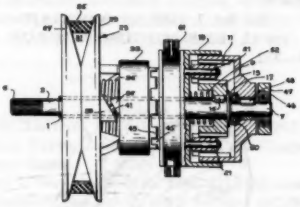
a planetary gear support radially extending from said driving shaft and mounted thereof for free rotation and slidable axial displacement therealong; planetary gears rotatably mounted on said support to be slidable therewith, said planetary gears meshing respectively with said sun gear and said internal gear;

a driving assembly on said driving shaft including a power transmission member integral with said driving shaft for rotation therewith, said member being disposed in radial facing relation with said planetary gear support;

cooperating gear teeth on said gear support and transmission member suitable to mesh together for forward driving gear vehicle through unison rotation of said sun gear, planetary gears and internal gear about the axis of said shafts;

a shift mechanism and

a control member mounted on said vehicle frame to be movable in two steps, said control member being connected to said shift mechanism to, in a first step, disengage said transmission member and said planetary gear support



causing said support idly to rotate through said sun gear and planetary gears with driven shaft coming to a stop under the resisting torque thereof and, in a second step, to stop rotation of said planetary gear support relative to said driving shaft thereby causing reverse rotation of said internal gear and driven shaft through said sun gear and planetary gears,

wherein said shift mechanism comprises:

ring means cooperating with a circumferential groove of said planetary gear support and having a first and a second radial arm respectively on opposite sides of said planetary gear support;

means mounting said first arm on said vehicle body for pivotal action of said ring means about an axis normal to the axis of said driving and driven shafts and means to displace said second radial arm to pivot said first arm, causing shifting of said planetary gear support for engagement and disengagement of the respective cooperating teeth;

resilient means acting on said second arm to bias said cooperating teeth in meshing engagement

a flexible cable fixed at one end to said control member and secured at the other end to said second arm, so constructed that pulling of said cable in one direction is against the bias of said resilient means and disengages said cooperating teeth in accordance with said first step; and

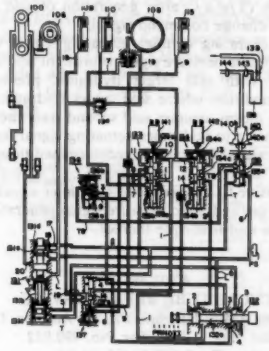
blocking means connected to said cable and operable, by further pulling of said cable in the said one direction and in accordance with said second step, to stop rotation of said planetary gear support.

4,502,354

HYDRAULIC PRESSURE CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

Tadashi Suzuki, and Norimasa Kishi, both of Yokosuka, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 2, 1981, Ser. No. 298,609
Claims priority, application Japan, Sep. 4, 1980, 55-121797
Int. Cl.³ B60K *41/06*
U.S. Cl. 74—866 **7 Claims**



7. A hydraulic pressure control system for reducing a shift shock in an automatic transmission, the automatic transmission including a change speed gearing mechanism operatively connected to an engine and having a plurality of gear positions including a first gear, a second gear and a third gear and being shiftable therebetween, and friction means operative by a hydraulic pressure for causing the change speed gearing mechanism to establish one of the plurality of gear positions, and shift valve means for supplying the hydraulic pressure to the friction means, said hydraulic pressure control system comprising:

means for generating an engine load signal indicative of a load on the engine;

means for generating an actual hydraulic pressure signal indicative of the actual hydraulic pressure supplied to the friction means;

means responsive at least to said engine load signal for generating a first to second gear change command signal and a second to third gear change command signal in accordance with a predetermined shift schedule;

means for generating a target hydraulic pressure signal indicative of a desired hydraulic pressure;

means for adjusting the magnitude of the hydraulic pressure supplied to the friction means so as to bring said actual hydraulic pressure signal into substantial agreement with said target hydraulic pressure signal;

said target hydraulic pressure signal generating means being shiftable between a first state where the target hydraulic pressure signal indicates a first desired hydraulic pressure for non-gear shifting operation and a second state where the target hydraulic pressure signal indicates a second desired hydraulic pressure for gear shifting operation, said second desired hydraulic pressure for gear shifting operation being lower than said first desired hydraulic pressure for non-gear shifting operation;

means responsive to said first to second gear change command signal for causing said target hydraulic pressure generating means to shift from said first state thereof into said second state thereof upon generation of said first to second gear change command signal;

means responsive to said first to second gear change command signal for actuating the shift valve means to initiate a shifting from the first to the second gear upon expiration

of a first predetermined time (T_{HOLD}) after generation of said first to second gear change command signal;

means responsive to said second to third gear change command signal for actuating the shift valve means to initiate a shifting from the second gear to the third gear upon generation of said second to third gear change command signal;

means responsive to said second to third gear change command signal for causing said target hydraulic pressure generating means to shift from said state thereof into said second state thereof upon expiration of a second predetermined time (T_{DOWN}) after generation of said second to third gear change command signal;

means for generating a timer actuating signal when said actual hydraulic pressure signal is brought into substantial agreement with said target hydraulic pressure signal under a condition where said target hydraulic pressure generating means assumes said second state thereof;

means responsive to said timer actuating signal for generating a timer signal for a third predetermined time (T_{KEEP}); and

means responsive to an absence of said timer signal for causing said target hydraulic pressure signal generating means to shift into said first state thereof.

4,502,355

BICYCLE TUBE REPAIR DEVICE

Bobby R. Squyres, 434 E. Hutchins Pl., San Antonio, Tex. 78221

Filed May 2, 1983, Ser. No. 490,832

Int. Cl.³ B60C *21/00, 25/16*

U.S. Cl. 81—15.2 **6 Claims**

1. In a bicycle tube repair device for repairing bicycle tire tubes mounted in tire casings adapted for use on bicycle wheels, a spherical member of a yieldable material, bands of a similar material integral with and extending from said spherical member adapted to be lodged between the tube and casing when the tire is in assembled relation and means for forcing said spherical member through a puncture in the tube.

4,502,356

PARTING SWORD ON EQUIPMENT FOR LETTING OUT HIDES

Herbert Dietrich, and Günther Mall, both of Kaiserslautern, Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

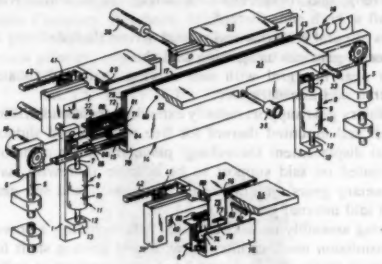
Filed Mar. 26, 1982, Ser. No. 362,108

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1981, 3113835

Int. Cl.³ B26D *7/02*; C14B *1/20*

U.S. Cl. 83—175 **6 Claims**

5. Equipment for the letting out of hides, including a holding device for holding a hide, two clamping jaws cooperating in plier fashion and movable relative to each other in a lengthwise direction, a parting sword between the jaws which is displaceable in a lengthwise direction, movable upwardly and downwardly and having a longitudinal groove and at a front end thereof a hide divider, as well as a cutting device which is movable in the lengthwise direction of the parting sword, characterized in that the parting sword is divided parallel to its longitudinal direction into plural parts, a first part being movable jointly with one of the clamping jaws associated with it in



the longitudinal direction relative to a second part of the sword.

4,502,357

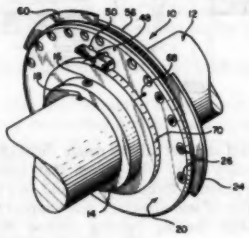
SLOTTING HEAD

Vahan A. Hussisian, 186 Edgemond La. PO Box 541, Barrington, Ill. 60010

Filed Jul. 7, 1983, Ser. No. 511,527

Int. Cl.³ B31B *1/22*; B26D *1/24, 7/26*

U.S. Cl. 83—332 **9 Claims**



1. A slotter head for use with paperboard printer slotters comprising:

a hub adapted to be affixed to a shaft;

a first annular plate carried by said hub and rotatable with respect to said hub;

a locking plate carried by said first annular plate and having thereon a first set of locking teeth;

a second set of locking teeth carried by said hub and engagable by said first set of locking teeth on said locking plate;

means carried by said first annular plate for operating said locking plate to lockingly engage and to disengage said first and second sets of locking teeth;

a second annular plate carried by said hub and removably affixed thereto;

a slotter knife removably affixed to the respective ones of said first and second annular plates;

said slotter knife removably affixed to said first annular plate being adjustable circumferentially with respect to said slotter knife removably affixed to said second annular plate by operating said locking means to disengage said first set of locking teeth with said second set of locking teeth and rotating said first annular plate with respect to said second annular plate.

4,502,358

KNIFE HOLDER FOR SLIDING MICROTOMES

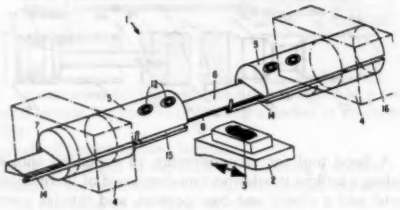
Werner Behme, Walldorf, Fed. Rep. of Germany, assignor to Parke, Davis & Company, Morris Plains, N.J.

Filed Dec. 13, 1982, Ser. No. 449,338

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1982, 8217317[U]

Int. Cl.³ B26D *1/02*

U.S. Cl. 83—700 **9 Claims**



1. In a sliding microtome having a specimen holder, a knife, and two knife mounts, one of said mounts being positioned on one side of the specimen and the other of said mounts being positioned on the other side of said specimen, the improvement comprising two elongated knife holders, each holder having a longitudinally extending bore adapted to encase a portion of the knife and being longitudinally slidable in a respective mount, lock means for releasably clamping each holder in a respective mount to selectively position each holder whereby the amount of knife exposed between said holders may be varied.

4,502,359

ELECTRONIC MUSICAL INSTRUMENT

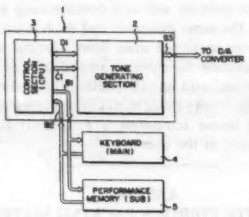
Shigenori Sano, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 361,470, Mar. 23, 1982, abandoned. This application Oct. 31, 1983, Ser. No. 547,454

Claims priority, application Japan, Mar. 31, 1981, 56-47644; Jun. 11, 1981, 56-90641

Int. Cl.³ G10H *1/00*

U.S. Cl. 84—1.19 **17 Claims**



1. An electronic musical instrument capable of simultaneously generating a plurality of tones for each of a plurality of channels in a time division basis processing, comprising:

channel control means including a shift register having shift stages corresponding in number to the plurality of channels provided by said time division basis processing, for storing different characteristic control data for each channel, and means coupled to said shift register for effecting control of channels to assign one of at least two different kinds of tones for each channel according to said characteristic control data delivered from said shift register; and

tone generating means coupled to said channel control means and including tone waveform memory means for storing data of at least two different waveforms representing different tone timbres and arranged to be supplied with said characteristic control data stored in said shift register to determine the waveform to be read out for each channel, wherein said tone generating means generates a tone timbre determined by the read-out waveform in the time division basis processing according to the control by said channel control means.

4,502,360

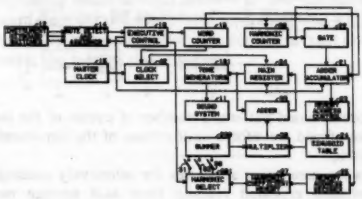
HARMONIC SELECTION COUPLING IN AN ELECTRONIC MUSICAL INSTRUMENT

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instruments Mfg. Co., Ltd., Hamamatsu, Japan

Filed Apr. 19, 1983, Ser. No. 486,473

Int. Cl.³ G10H *1/00, 7/00*

U.S. Cl. 84—1.23 **11 Claims**



11. In combination with a musical instrument in which a musical tone is synthesized by evaluating the constituent Fourier components of a musical waveshape from a preselected set of harmonic coefficients, apparatus for selectively combining said set of harmonic coefficients to produce the tonal effect of intramanual coupling comprising;

a harmonic coefficient memory for storing said preselected set of harmonic coefficients wherein said set is equal in number to the number of said constituent Fourier components,

a plurality of harmonic coefficient select means each of which selects a subset of said set of harmonic coefficients,

a harmonic combining means whereby said subsets of said set of harmonic coefficients are combined to form a combination set of harmonic coefficients,

a means for computing responsive to said combination set of harmonic coefficients for evaluating said constituent Fourier components, and

means for producing musical waveshapes from said constituent Fourier components.

4,502,361

METHOD AND APPARATUS FOR DYNAMIC REPRODUCTION OF TRANSIENT AND STEADY STATE VOICES IN AN ELECTRONIC MUSICAL INSTRUMENT

Jouko O. Viltanen, Tavastia, Finland, and John T. Whitefield, Harleysville, Pa., assignors to Allen Organ Company, Macungie, Pa.

Filed Dec. 8, 1983, Ser. No. 559,585

Int. Cl.³ G10H *1/02, 7/00*

U.S. Cl. 84—1.26 **28 Claims**

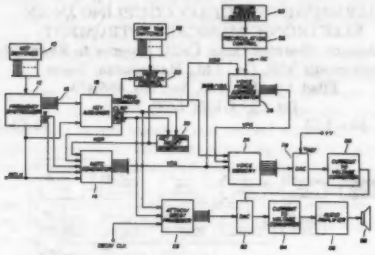
1. In an electronic musical instrument having a greater number of selectively actuable key switches than tone generators to cause the production of sounds corresponding to the notes in a musical scale, an apparatus for reproducing the complete attack transient and steady state portions of a waveform comprising:

means for detecting the depression and release of a key switch;

means for storing a complete attack transient of a waveform and a predetermined number of full cycles of the steady state of said waveform, said waveform containing enve-

lope characteristics and being of an harmonically and non-harmonically varying content changing with time;

means for generating addresses for selectively causing the reading from said storage means the complete attack transient of the waveform and the predetermined number of full cycles of the steady state of said waveform, and for generating addresses for selectively causing the repeated reading from said storage means, either randomly or in a



predetermined pattern, a number of cycles of the steady state of said waveform until release of the depressed key switch;

means for generating addresses for selectively causing the continued repeated reading from said storage means, either randomly or in a predetermined pattern, a number of cycles of the steady state of said waveform during the decay transient of the waveform until audio ceases.

4,502,362

MOUTH ORGAN

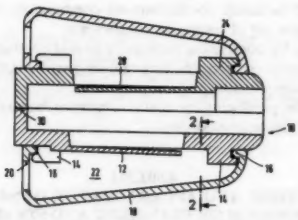
Ernst Zacharias, Trossingen, Fed. Rep. of Germany, assignor to Matth. Hohner AG, Trossingen, Fed. Rep. of Germany

Filed Sep. 15, 1983, Ser. No. 532,355

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1982, 3235034

Int. Cl.³ G10D *7/12*

U.S. Cl. 84—377 **20 Claims**



1. A mouth organ, said mouth organ having plural air slots and sets of pressure and suction voice reeds, said organ comprising:

a first molded plastic body portion, said first body portion defining part of all of the air slots, said first body portion also including a first set of integral voice reeds;

a second molded plastic body portion, said second body portion cooperating with said first body portion to complete the definition of the air slots, said second body portion having integral therewith a second set of voice reeds, said first and second body portions being in abutting relationship and forming an air slot body with integral oppositely disposed sets of pressure and suction voice reeds; and

cover shell means, said cover shell means engaging said air slot body and defining the sound orifices of the mouth organ.

4,502,363

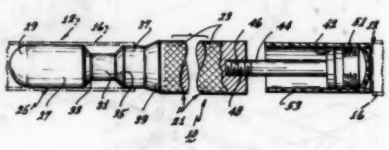
METHOD AND TOOL FOR RECONDITIONING EXPENDED SHOTSHELLS

Ross W. Zimmerman, 113 S. Broadway, Box 324, Sterling, Kans. 67579

Filed Jul. 13, 1983, Ser. No. 513,466

Int. Cl.³ F42B *33/10*

U.S. Cl. 86—24 **14 Claims**



1. A hand tool for reconditioning an expended shotshell including a hollow tubular portion composed of thermoplastic material and a closed end base portion, said tubular portion having an opened mouth portion at the opposite end thereof, said mouth portion being crimped axially, comprising: an elongated body member having a rear handle portion terminating at its front end in a conductive tip portion, said handle being adapted to be held in the hand of the user, the outer surface of said tip portion being adapted to be heated by an external source of heat to a high temperature in a range between 275 degrees Fahrenheit and about 325 degrees Fahrenheit sufficient to melt the thermoplastic material of the shotshell tubular portion and to be inserted into the tubular portion of the shotshell to smooth out the axially extending crimps for reshaping purposes, said body member having an intermediate reduced diameter portion disposed adjacent to and rearwardly of the tip portion of the body member to retard greatly the axial rearward transfer of heat therethrough, and said body member having a generally cylindrical larger diameter shell conditioning portion disposed adjacent and rearwardly of the reduced diameter portion to maintain said shell conditioning portion at a lower temperature relative to the hot tip portion, said shell conditioning portion for receiving the melted mouth portion of the tubular portion of the shotshell and for permitting it to cool slightly to maintain its circular cross-sectional shape as the heated tip portion advances manually in an axial direction toward the end portion of the tubular portion, wherein said reduced diameter portion and said conditioning portion each has substantially the same diameter and each is axially tapered increasing in cross-sectional area from the tip end portion rearwardly to facilitate the entering of the interior of the shotshell tubular portion, said handle portion being disposed in an axial rearward direction of said shell conditioning portion to be maintained at a lower temperature to permit the grasping thereof by the hand of the user.

4,502,364

COMPOSITE FIBROUS PACKING MATERIAL CONTAINING FIBERS OF AROMATIC SULFIDE POLYMERS

Jerry Zucker, Charleston; John W. Hawkins, Ahan, and John J. O'Brien, Mt. Pleasant, all of S.C., assignors to RM Industrial Products Company, Inc., North Charleston, S.C.

Filed Sep. 22, 1983, Ser. No. 534,674

Int. Cl.³ D04C *1/00;* **D02G** *3/02, 3/00;* **B32B** *27/00*

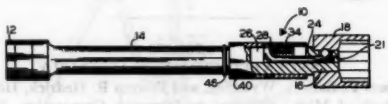
U.S. Cl. 87—8 **3 Claims**

1. A packing comprising a plurality of braided yarns, said yarns comprising an inner core and an outer layer protecting the inner core, said core comprising fibers selected from the group consisting of fibers of glass, acrylic and mixtures thereof, said outer layer comprising polyphenylene sulfide, wherein the amount of polyphenylene sulfide in said packing is at least 15 percent by weight and wherein the core comprises from about 10 to about 60 percent by weight of the yarns.

4,502,365
SOCKET WRENCH EXTENSION

Karl M. Hacker, 1921 Dover La., Castleton, N.Y. 12033

Filed Sep. 2, 1982, Ser. No. 414,291
Int. Cl.³ B25B 13/00
U.S. Cl. 81—177 G 8 Claims



1. An extension for use with the drive member of a socket wrench system for positively holding a socket in place, comprising:

a shaft of predetermined length;

means on one end of the shaft for receiving a socket;

means on the other end of the shaft for operatively attaching the extension to the drive member;

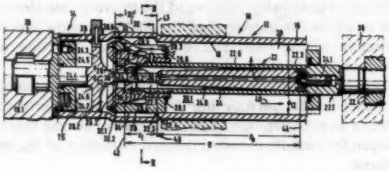
means for securing the socket onto the receiving means, said means being operable between a first position for positively locking the socket to the extension member and a second position for releasing the socket from the extension member; and

control means located on the shaft for operating said securing means between said locking and releasing positions, said control means includes means for urging the socket from the receiving end while simultaneously moving the securing means to its releasing position.

4,502,366
HYDRAULIC RECOIL BRAKE SYSTEM FOR BRAKING THE GUN BARREL RECOIL MOVEMENT AFTER THE FIRING TRAVERSE

Josef Metz, Neuss, and Erich Zielisnki, Haan, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH., Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 185,581, Sep. 9, 1980, abandoned. This application Oct. 31, 1983, Ser. No. 527,317
Claims priority, application Fed. Rep. of Germany, Oct. 25, 1979, 2943083
Int. Cl.³ F41F 19/02
U.S. Cl. 89—43 R 1 Claim



1. A recoil brake for use between a gun mount and barrel, the brake comprising:

an elongated cylinder centered on an axis and formed with an axially relatively short front portion of relatively large diameter and an axially relatively long rear portion of relatively small diameter adjoining the front portion, the cylinder having closed front and rear ends delimiting a chamber extending axially along both portions, so that the cylinder is secured to the gun mount with the front portion turned toward the barrel;

an annular piston having an outside diameter equal substantially to the relatively small diameter of the rear front portion, subdividing the chamber into front and rear compartments, and having axially oppositely directed rear and front faces exposed in the respective compartments, the piston being formed with at least one radially outwardly open and axially extending groove opening axially rearward at the rear piston face and with a radially throughgoing passage opening into the groove axially forward of the rear piston face, the groove being at least partially in front of the passage of uniformly decreasing flow cross section and terminating axially rearward of the front piston face, so that fluid flow along the groove and around the piston between the compartments is uniformly throttled and terminated as the piston moves rearwardly and the groove moves wholly into the small-diameter rear cylinder portion;

an at least partially tubular piston rod extending axially rearward from the piston through said cylinder rear end and being forwardly open so as to be in communication with the front compartment;

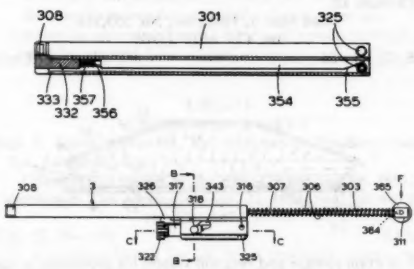
a separating wall secured in said cylinder in front of said front compartment;

a regulating mandrel fixed relative to and extending rearward from the rear side of said separating wall and having an axially rearwardly diverging control portion extending inside the tubular piston rod.

4,502,367
FIREARMS BOLT CARRIER ASSEMBLY

Leroy J. Sullivan, Faber Heights, Singapore, assignor to Chartered Industries of Singapore Private Ltd., Jurong Town, Singapore

Division of Ser. No. 520,117, Aug. 3, 1983, Pat. No. 4,475,437, which is a division of Ser. No. 280,740, Jul. 6, 1981, Pat. No. 4,416,186. This application Jun. 25, 1984, Ser. No. 624,091
Claims priority, application United Kingdom, Dec. 11, 1980, 8039739
Int. Cl.³ F41D 11/12, 5/04
U.S. Cl. 89—181 24 Claims



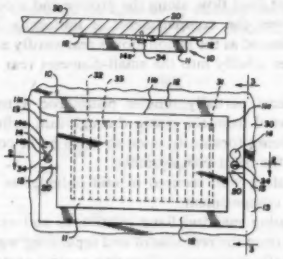
1. A bolt carrier assembly for a gas operated gun including a housing means, a bolt supported within said housing means, a P-cross sectionally shaped member having the longer side of the P shaped member secured to said housing means, said P shaped member having the closure of the P formed by a wrapped over portion, and said P shaped member being forwardly extended with respect to the bolt to lie adjacent a gas cocking system of the gun which is provided a predetermined distance along a barrel of said gun, and a main drive spring located alongside the wrapped over portion of the P shaped member for providing motion to the housing means and said P shaped member.

4,502,368

AIR VENT COVER

George T. Hempel, 139 Shady Brook, DeSoto, Tex. 75115

Filed Aug. 15, 1983, Ser. No. 523,106
Int. Cl.³ F24F 7/00
U.S. Cl. 98—29 4 Claims



3. A cover for an air vent in a building panel comprising:

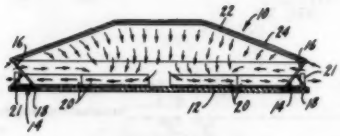
a parallelopiped shaped hollow central enclosure portion having a panel larger than said air vent and provided with end said side walls forming with said panel an enclosure larger than a louvre mounted over said air vent, and a peripheral flange having opposite ends and opposite side portions formed integral with said enclosure portion joining said end and said side walls for fitting against said building panel around said vent opening, said end flange portions each being provided with a centrally located keyway opening having a round portion and a substantially rectangular slot portion narrower in width than said round portion, and a latch surface in each of the outer surfaces of said end flange portions, said latch surfaces being provided each on an inclined plane whereby said end flange portion is thicker along said slot portion of said keyway than along said round portion of said keyway to provide a wedging effect with a mounting screw head.

4,502,369

GRAIN STORAGE STRUCTURES

John Aldag, Chicago, Ill., assignor to Bantam Systems, Inc., Chicago, Ill.

Filed Mar. 1, 1982, Ser. No. 353,184
Int. Cl.³ A01F 25/08
U.S. Cl. 98—56 12 Claims



1. A grain storage and aeration system for protecting a mass of stored grain, comprising:

a floor underlying a grain storage area for accommodating a mass of grain;

a series of free-standing support trusses at spaced locations around the periphery of the floor, each support truss having a base, a main beam, and a brace fastened together in an A-frame configuration;

a plurality of perforated sheet metal sidewalls mounted on the trusses, and enclosing the floor;

a first set of perforated aeration ducts extending across the floor in spaced relation to each other, at the bottom of a grain mass deposited on the floor;

a second set of perforated aeration ducts extending across the top of the grain mass;

a flexible cover secured to the side walls, and overlying the grain mass and the second set of aeration ducts, the cover and the second set of aeration ducts being supported by the grain mass; and

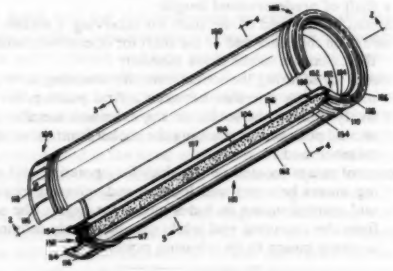
fan means connected to one set of the ducts to circulate air through both sets of ducts, through the sidewalls and through the grain mass, thereby aerating the entire grain mass.

4,502,370

INSULATED CHIMNEY ASSEMBLY

James P. Baileys, Wyoming, and Warren R. Hedrick, Holland, both of Mich., assignors to Interpace Corporation, Parsippany, N.J.

Filed Apr. 15, 1983, Ser. No. 485,226
Int. Cl.³ F23L 17/02
U.S. Cl. 98—60 6 Claims



1. In a chimney assembly for use with flue gases having a wide range of temperature excursions, wherein the assembly comprises axially connectable linear sections, each having substantially cylindrical and concentrically positioned inner, intermediate and outer sleeves, and means for securing the intermediate sleeve to the outer sleeve, the improvement which comprises:

solid pack insulation material between the intermediate sleeve and the outer sleeve;

means for securing only one end portion of the inner sleeve to an end portion of the intermediate sleeve while maintaining the remaining portions of the inner sleeve in a floating relationship relative to the intermediate sleeve so as to allow for unrestrained thermal expansion and contraction of the inner sleeve in an axial direction with respect to the intermediate sleeve; and

the remaining portions of the inner sleeve are maintained in a spaced apart relationship relative to the intermediate sleeve so as to provide a spatial insulative air gap therebetween for radially outward thermal expansion of the inner sleeve.

4,502,371

COFFEE PERCOLATOR PROVIDED WITH A DEVICE FOR DELIVERING COFFEE INFUSION AS WELL AS STEAM

Donato Di Lascio, Via Per Armeno 8, 28010 Miasino (Novara), Italy

Filed Feb. 23, 1984, Ser. No. 582,703
Claims priority, application Italy, Feb. 28, 1983, 20956/83[U]
Int. Cl.³ A47J 31/30
U.S. Cl. 99—293 3 Claims

1. A coffee percolator comprising in combination:

a bottom container acting as a boiler;

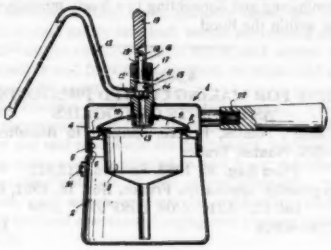
a coffee-holder funnel removably mounted within said bottom container;

a top element sealingly mounted on said bottom container

having a top cap defining a chamber above said removable coffee-holder funnel;

a valve unit outwardly projecting from said cap and having an axial passage;

a shutter movable along said axial passage;



a spout branching off from said valve unit having an inlet opening in said axial passage; and

means associated to said valve unit for shifting said shutter from a lower position in which the shutter closes said spout inlet to an upper position in which the same shutter does not close the same spout inlet.

4,502,372

DEEP-FRYER PAN FOR INDUSTRIAL FRYERS

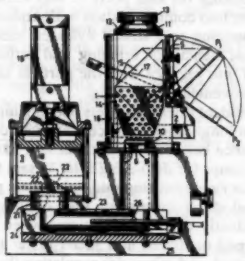
René G. Mariotti, Saint Cloud, France, assignor to Friteco, Inc., Oakton, Va.

Continuation of Ser. No. 433,875, Oct. 13, 1982, abandoned, which is a continuation-in-part of Ser. No. 356,803, Mar. 10, 1982, abandoned. This application May 11, 1984, Ser. No. 608,929

Claims priority, application France, Mar. 13, 1981, 81 05027

Int. Cl.³ A47J *37/12*

U.S. Cl. 99—330 **20 Claims**



1. An industrial deep-fryer for frying refrigerated foods to be consumed after frying in oil comprising:

a frying pan formed from a closed enclosure having an opening and an air inlet and outlet;

a frying basket mounted in said enclosure for holding food during frying in said pan;

a door closing said opening and movable between an open and closed position;

means for directing said refrigerated food into said basket for frying when said door is in an open position;

means for supplying oil to said pan; and

means connected between said air inlet and outlet for circulating air and oil droplets entrained in the air therebetween without release of entrained oil to the atmosphere outside said pan and condensing moisture and collecting entrained oil droplets.

4,502,373

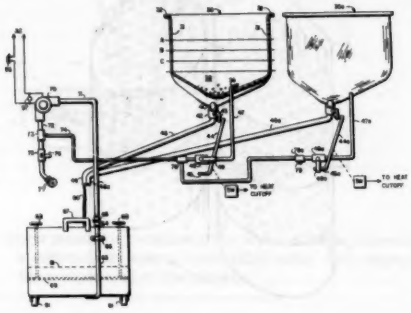
CLEANING SYSTEM FOR DEEP FRYER

Richard T. Keating, 144 N. Cuyler, Oak Park, Ill. 60302

Filed Mar. 25, 1983, Ser. No. 478,542

Int. Cl.³ A47J *37/12*

U.S. Cl. 99—337 **3 Claims**



1. A common filter and cleaning system for at least two deep fat fryers each of which includes a vessel having a tapered bottom and a drain for holding a quantity of liquifiable fat or oil, means in said fat for heating said fat to cooking temperature and means for suspending food in said heated fat for cooking, dislodged particles of food falling to the bottom of said vessel and tending to deteriorate said fat, comprising:

filter means including a portable tank having a filter screen for removing contaminants from said fat;

drain valve means for passing fat from each of said vessels through said filter screen into said portable tank; and

a nozzle in the bottom of each said vessel for circulating filtered fat along the bottoms of said vessels in a whirlpool-like non-aerated cleansing flow for carrying dislodged food particles from said vessels to said filter screen;

wherein each said nozzle is connected to a separate flow control valve;

separate interlock means operatively associated between each said drain valve means and the respective flow control valve for precluding opening of a drain valve unless its corresponding flow control valve is open; and

a pump for returning filtered fat to said vessels through said nozzles via said flow control valves.

4,502,374

CLAMSHELL BASKET

Jack L. Davis, Louisville, Ky., assignor to Winston Products Co., Louisville, Ky.

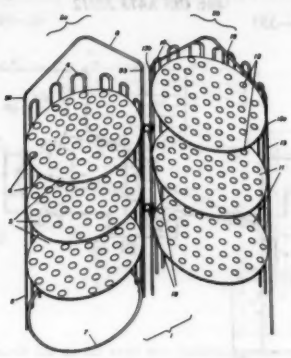
Continuation-in-part of Ser. No. 271,635, Jun. 8, 1981, abandoned. This application Apr. 21, 1983, Ser. No. 487,183

Int. Cl.³ A47J *37/12*

U.S. Cl. 99—349 **6 Claims**

1. A cooking basket for use in an upwardly open cooking chamber containing a heat transfer fluid with heater means to selectively heat the heat transfer fluid where the basket is disposed within the chamber with its longitudinal axis generally parallel to the longitudinal axis of the chamber and where the basket is defined by first and second generally porous sidewalls of selected cross sectional shape each sidewall having a first longitudinal edge and diametrically opposed longitudinal second edge, hinge means pivotably, joining said first edge of each of the first and second side wall means so said second edge of the first and second sidewalls can be closed with second edges in adjoining relation to form the basket and opened about the hinge means to provide access to the chamber defined by each of the first and second sidewalls and wherein each wall section includes shelf means disposed therein extending transversely from the respective sidewall means so that

when the sidewall means are closed the shelf means of the first and second sidewall means are mutually disposed in interleaving fashion and where the hinge means are adapted to permit relative longitudinal movement between the first and second



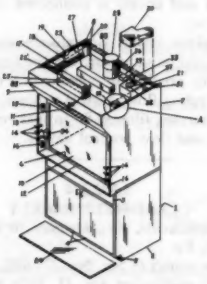
sidewall means so that when the basket is closed the spacing between the shelf means of the first and second sidewall means can be selected with the food to be cooked contained between the shelf means of the first and second sidewall means.

4,502,375

FUME HOOD SASH OPERATOR

Alan L. Hignite; Richard L. Wendt, both of Midland; Roy F. Zeigler, Freeland, and Warren L. Zeigler, Midland, all of Mich., assignors to Tri City Laboratory Specialists, Inc., Midland, Mich.

Filed Aug. 18, 1983, Ser. No. 524,456
Int. Cl.³ F23J *11/00*
U.S. Cl. 98—115 LH **14 Claims**



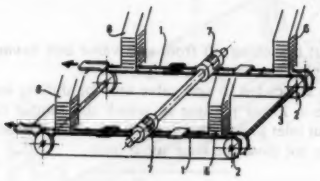
3. A clutch and drive mechanism to provide a sash member operation for fume hood structures comprising a power source mounted on a stationary portion of the fume hood structure and having attached thereto by suitable means, a drive pulley, a freely rotatable dual grooved master cable pulley mounted on said structure and spaced some distance from said drive pulley and connected to said drive pulley by a V-belt extending between and over said drive pulley and over the dual grooved master cable pulley, a clutch mechanism disposed adjacent to said drive pulley and said dual grooved master cable pulley and comprising a solenoid mounting plate mounted on said structure, a solenoid mounted on said solenoid mounting plate, a clutch arm associated with and actuated by said solenoid and an idler wheel located at the distal end of the clutch arm opposite the solenoid, said idler wheel horizontally mounted and freely rotatable in said distal end of said clutch arm, a cable, connected to said sash member as a means of controlling said sash member, the cable extending between the sash member and a hood idler pulley which has been vertically mounted on said structure, said cable continuing over the hood idler pulley extending to and over the dual grooved master cable pulley, the cable continuing to and over one or more further hood idler pulleys which have been mounted on said structure, said cable terminating and connecting to a freely moving weighted structure within the hood.

4,502,376

MACHINE FOR MAKING COATED PRODUCTS SUCH AS BISCUITS OR COOKIES

Lionel Cossé , Nantes, France, assignor to Biscuiterie Nantaise—BN, Nantes, France

Filed Aug. 30, 1982, Ser. No. 412,922
Claims priority, application France, Dec. 16, 1981, 81 23788
Int. Cl.³ A21C *9/04*; B29F *3/01, 3/04*
U.S. Cl. 99—450.4 **12 Claims**



1. A machine for preparing elements with a layer of filler thereon, said machine comprising conveyors each serving a station for supplying bottom elements and a filler depositing station, rotational drive means for said conveyors, the filler depositing station comprising a fixed stencil cylinder having longitudinally spaced apart stencil ports, a valve member coaxially received in said stencil cylinder, a pneumatic cylinder for imparting angular movement to the value member for controlling the same, said pneumatic cylinder being responsive to the starting and stopping of said machine, said valve member selectively closing off said ports in said stencil cylinder and bringing them into communication with orifices in a rotational stencil surrounding said stencil cylinder, means for rotating said rotational stencil for bringing said orifices in said rotational stencil into registry with the ports in said stencil cylinder, the improvement comprising:

two independent filler feed inlets opening into said rotational stencil at longitudinally spaced intervals corresponding to the distance between the ports in said fixed stencil, volumetric pumps for delivering filler to said filler feed inlets, means for synchronizing said volumetric pumps with said rotational drive means for said conveyors, means for independently driving said pumps when said conveyors are stopped or driven at a speed lower than a predetermined speed, and means for regulating the supply of filler to said volumetric pumps.

4,502,377

SAFETY SYSTEM FOR APPARATUS FOR PROCESSING FROZEN COMESTIBLES

James F. Hall, Jr., Ardsley, Pa., assignor to Custom Creamery Systems, Inc., New York, N.Y.

Filed Feb. 28, 1984, Ser. No. 584,519
Int. Cl.³ A23G *9/02, 9/04*
U.S. Cl. 99—492 **3 Claims**

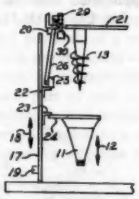
1. A safety apparatus for processing a frozen comestible, including a receptacle for deposit of said frozen comestible therein; a rotatable auger for rotatively contacting and processing said comestible when said auger is in operational engagement with said receptacle;

means for causing operational engagement between said receptacle and said rotatable auger;

means for causing rotation of said auger when said auger and said receptacle are in operational engagement and operatively connected to said means for causing auger rotation, and safety interlock means adapted to foil bodily access to said rotating auger;

said safety interlock means comprising an access panel movable between a fully open, partially open, and a closed position, said safety interlock means preventing actuation of said auger rotation means when said access panel is disposed in said fully open position, or when said receptacle and said auger are disengaged;

an auger rotation limit switch that is normally open when said access panel is in the fully open position, or when said auger and said receptacle are disengaged, said limit switch being operatively connected to said auger rotation means for causing rotation of said auger when said switch is closed, and means operatively connecting said access panel and said operational engagement means to said limit switch;



said means operatively connecting said access panel and said operational engagement means to said limit switch including limiting stop means, a follower and cam linkage disposed between said limit switch and said limiting stop means, said limiting stop means being engagable by either said access panel or said operational engagement means;

said limiting stop means including a first abutment that is affixed to an inside portion of said access panel, said follower resting upon said first abutment and attached to said cam link age, whereby said switch will remain open when said cam over rides said switch as said access panel is moved to said fully open position;

said access panel including a second abutment that is operatively engagable with said receptacle when said receptacle is caused to engage with said auger, whereby said access panel will be automatically raised to a partially open position and said limit switch will be closed by said follower and cam linkage causing said auger to rotate.

4,502,378

HYDRAULIC RESERVOIR FOR SILAGE COMPRESSION MACHINES

Steven R. Cullen, Astoria, Oreg., assignor to Ag-Bag Corporation, Astoria, Oreg.

Filed Sep. 12, 1983, Ser. No. 531,085
Int. Cl.³ A01F *25/16*; B65G *3/04*
U.S. Cl. 100—65 **1 Claim**

1. For use in a silage compression machine of the type having a transversely extending main beam, and a primary shaft positioned beneath the main beam for rotating a plurality of teeth to force material through a passageway and into a tunnel including an arcuate wall extending upwardly and rearwardly from the main beam, a hydraulic reservoir comprising:

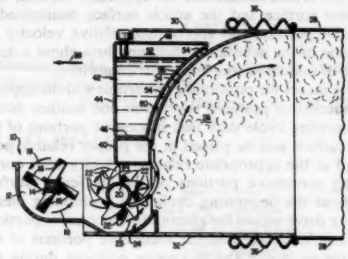
a bottom wall supported on the main beam;

a front wall extending substantially vertically upwardly from the front edge of the bottom wall;

a top wall extending substantially horizontally rearwardly from the upper edge of the front wall;

a rear wall extending upwardly and rearwardly from the rear edge of the bottom wall to the rear edge of the top wall and adjacent to the arcuate wall of the tunnel;

a pair of end walls secured to the edges of the bottom front, top and rear walls to define an enclosed hydraulic fluid reservoir; and



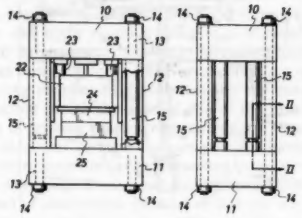
spacer means for maintaining the rear wall of the reservoir in a substantially spaced apart relationship with respect to the arcuate wall of the tunnel.

4,502,379

PRESS FRAME

Mitsuo Sato, Kanagawa, Japan, assignor to Aida Engineering Ltd., Sagamihara, Japan

Filed Jul. 14, 1983, Ser. No. 514,143
Claims priority, application Japan, Jul. 14, 1982, 57-122347
Int. Cl.³ B30B *15/04*
U.S. Cl. 100—214 **6 Claims**



1. In combination, a press frame having a bed, a crown spaced above the bed, connecting means between the crown and the bed supporting the crown on the bed and holding the crown in position relative to the bed, die means on said press frame having upper and lower dies which have a die gap between them when moved to the closest point to each other during operation of the press, and at least one adjustment part extending between the crown and the bed and piston-cylinder means for exerting a force on said adjustment part, which force is transmitted by said adjustment part to said crown for exerting a force on the crown to extend the connecting means and thereby adjust the die gap.

4,502,380

APPARATUS AND METHOD FOR DECORATING ARTICLES OF NON-CIRCULAR CROSS-SECTION

Neil A. Meador, Montvale, N.J., assignor to Permanent Label Corporation, Clifton, N.J.

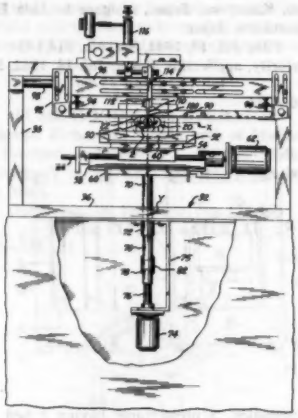
Continuation-in-part of Ser. No. 481,308, Apr. 1, 1983, Pat. No. 4,469,022. This application Feb. 24, 1984, Ser. No. 583,174
The portion of the term of this patent subsequent to Sep. 4, 2001, has been disclaimed.
Int. Cl.³ B41F *17/00*
U.S. Cl. 101—38 R **17 Claims**

1. Apparatus for decorating the surface of an article having a non-circlar cross-sectional configuration, the apparatus in-

cluding an applicator having a surface for applying a decorating medium to the article surface at successive corresponding portions of the article surface and the applicator surface, with the applicator surface and the article surface maintained in proper relative position and appropriate relative velocity for the application of the decorating medium, throughout a decorating cycle of operation, the apparatus comprising:

positioning means for positioning the article and the applicator at successive positions relative to one another during the decorating cycle such that successive portions of the article surface will be placed in the proper relative position and at the appropriate relative velocity with corresponding successive portions of the applicator surface throughout the decorating cycle, the positioning means including drive means for placing the successive portions of the article surface and the successive portions of the applicator surface at the successive positions during the decorating cycle;

detecting means for detecting the successive relative positions of the article and the applicator at which the successive portions of the article surface are placed in the proper position relative to the corresponding successive portions of the applicator surface, based upon the cross-sectional configuration of the article, and for determining the condition of the positioning means when the article and the



applicator are at each of said successive relative positions so as to provide article-configuration information pertaining to the condition of the positioning means as determined by the surface contour of the cross-sectional configuration of the article;

information processing means for receiving said article-configuration information from the detecting means, and for providing operating information for actuation of the positioning means; and

actuating means for actuating the positioning means in accordance with the operating information provided by the information processing means to actuate the drive means such that the proper relative position and the appropriate relative velocity are maintained between the article surface and the applicator surface throughout the decorating cycle;

the drive means including

rotating means for rotating the article about a longitudinal first axis, relative to a corresponding home position; and

translating means for translating the first axis laterally in directions perpendicular to the first axis, relative to a further corresponding home position; such that

the condition of the positioning means when the article is at each of the successive positions is determined at least partly by the angular position of the article about the first axis and the location of the first axis, relative to the corresponding home positions; and

the translating means including

first moving means for moving the first axis along directions parallel to a second axis; and

second moving means for moving the first axis along directions parallel to a third axis;

the first, second and third axes being mutually perpendicular such that the condition of the positioning means when the article is at each of the successive positions is determined at least partly by the location of the first axis relative to the second and third axes.

4,502,381

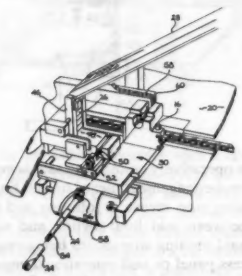
ROTATIONAL REGISTER SYSTEM

Thomas Liguori, San Diego, Calif., assignor to National Pen Corporation, San Diego, Calif.

Continuation-in-part of Ser. No. 214,176, Dec. 8, 1980, abandoned. This application May 24, 1983, Ser. No. 497,662

Int. Cl.³ B41F *17/22*

U.S. Cl. 101—40 **11 Claims**



1. In a rotational register system having a driving belt, a plurality of mandrels joined to said belt, engagement means for axially rotating said mandrels as said mandrels proceed around said driving belt and a plurality of print stations arranged such that an object to be printed disposed on each said mandrel is passed through each print station where it is printed, the improvement comprising:

each said mandrel having a first alignment means adjacent one end thereof for selectively engaging and rotationally aligning said object to be printed, a second alignment means disposed adjacent to the other end thereof for rotationally aligning and rotating said mandrel by interaction with said engagement means, and a third alignment means on said mandrel, for rotationally positioning said mandrel prior to said mandrel being rotated by said engagement means, said third alignment means comprising a pointed index member and a cam member, both mounted on said mandrel adjacent said second alignment means.

4,502,382

HEAD FOR IMPACT TYPE OF DOT LINE PRINTER

Masao Kunita, and Toshio Kurihara, both of Tanashi, Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Oct. 7, 1983, Ser. No. 540,213

Claims priority, application Japan, Jan. 28, 1983, 58-011352

Int. Cl.³ B41J *3/10*

U.S. Cl. 101—93.04 **6 Claims**

1. A head for an impact type of dot printer, comprising:

a frame formed of a non-magnetic material and having an elongated shape;

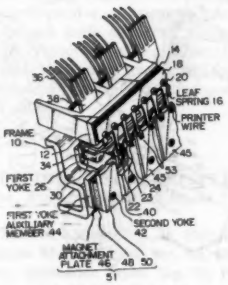
a plurality of first yokes formed of a magnetically permeable material, arrayed along the direction of elongation of said frame and fixedly attached thereto, with a gap of fixed

width being provided between mutually adjacent ones of said first yokes;

a plurality of coil cores arrayed at regular intervals along the direction of elongation of said frame, with a pair of said coil cores being fixedly attached to each of said first yokes and disposed to protrude outward therefrom;

a plurality of coils, each formed on a corresponding one of said coil cores;

a plurality of magnet blocks arrayed along the direction of elongation of said frame, each provided with attachment means, with a gap of fixed width being provided between mutually adjacent ones of said magnet blocks, each of said magnet blocks being positioned such as to span a gap between a pair of mutually adjacent ones of said first yokes, and each comprising a permanent magnet and a second yoke mutually fixedly attached to form an integral unit, each of said second yokes being formed of a magnetically permeable material and having a pair of magnetic coupling portions formed at one end thereof, said magnetic coupling portions being disposed respectively closely adjacent to and separated by an air gap of fixed width from the end portions of a corresponding pair of said coil cores which are disposed on opposite sides of a gap formed between a corresponding pair of said first yokes to which said pair of coil cores are respectively fixedly attached, whereby said permanent magnet has one magnetic pole thereof coupled to a corresponding one of said second yokes and the opposite magnetic pole thereof



coupled through said pair of coil cores to said first yokes on which said coil cores are attached;

a plurality of leaf springs arrayed along the direction of elongation of said frame, each of said leaf springs having one end thereof fixedly attached to said frame and having the free end thereof disposed adjacent to the outer end of a corresponding one of said coil cores;

a plurality of armatures, each formed of a magnetically permeable material and fixedly attached at the free end of a corresponding one of said leaf springs, and;

a plurality of printer rods arrayed along the direction of elongation of said frame, each of said printer rods being fixedly attached to a corresponding one of said armatures and protruding outward therefrom;

each of said magnet blocks acting in conjunction with said corresponding pair of first yokes and a corresponding pair of said armatures to form a corresponding pair of magnetic flux circuits for the magnetic flux of said permanent magnet, said magnetic flux circuits acting to normally retain the free ends of corresponding ones of said leaf springs in contact with the ends of said corresponding pair of coil cores by magnetic attraction acting upon said corresponding pair of armatures in opposition to the forces of said leaf springs, each of said coils being responsive to apulse of drive current passed therethrough for momentarily producing a magnetic flux which acts in opposition to the magnetic flux of the corresponding permanent magnet to thereby momentarily release the corresponding leaf spring from the magnetically attracted condition thereof.

4,502,383

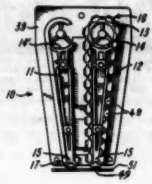
PRINT HEAD

Shinsuke Okabe, Tokyo, Japan, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Mar. 14, 1983, Ser. No. 475,283

Int. Cl.³ B41J 1/60

U.S. Cl. 101—111 **3 Claims**



1. A print head having at least two identical supports, each support having a pair of outwardly extending projections and means providing a support surface, a series of printing bands extending about one of the supports, each printing band having a series of printing bases, the bases having printing elements, the printing bands being composed of elastomeric material, one printing element of each printing band being supportable at the support surface of the one support member, a longitudinally extending printing member supported by another of the supports, the printing member including a pair of spaced arm portions having terminal ends and a connecting bight portion, the arm and bight portions being in a transverse generally U-shaped arrangement, the bight portion providing a base having an outer surface, a transverse section across the base of the printing member being substantially the same as a transverse section across the base of one of the printing bands, a plurality of printing characters extending in a lengthwise direction on the outer surface, the arm portions having inner surfaces with opposed inwardly extending projections, the printing member being of one-piece molded construction and being composed of elastomeric material so that the arm portions are spreadable to enable the inwardly extending projections to clear the outwardly extending projections and to grip the outwardly extending projections when the bight portion has moved into supported relationship with respect to the other support surface, and the printing characters on the printing bands which are supported by the one support surface being coplanar with the printing characters of the printing member.

4,502,384

METHOD AND DEVICE FOR CHANGING PRINTING ELEMENTS IN A PRINTING UNIT OF A PRESS

Hans Habluetzel, Echandens, Switzerland, assignor to Bobst SA, Lausanne, Switzerland

Filed May 4, 1983, Ser. No. 491,524

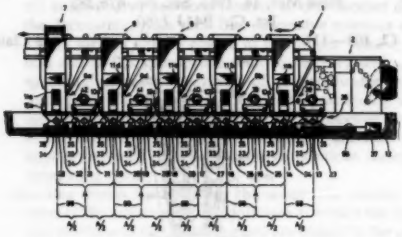
Claims priority, application Switzerland, May 6, 1982, 2913/82

Int. Cl.³ B41F 9/00

U.S. Cl. 101—153 **9 Claims**

1. A method for changing the printing elements in printing units of a printing press which units are spaced a distance A from each other, said method comprising the steps of providing a table composed of a plurality of interlocked plates beneath each of the carriages in each unit, said table having two plates for each unit and means for separating raising each of said plates, positioning a carriage containing a new engraving cylinder on each empty plate while the adjacent plate is positioned beneath a carriage in each unit; stopping the press, lifting all of the plates from a lower position to an upper posi-

tion to disengage each of the carriages from the printing unit; shifting the lifted plates in a first direction by a distance equal to one-fourth of the distance between the units; lowering the plates to a lower position; positioning trolleys to extend into apertures in a side frame to receive a pressure roll of each unit; removing the pressure roll on the trolley; inserting a new trolley containing a new pressure roll to position the new



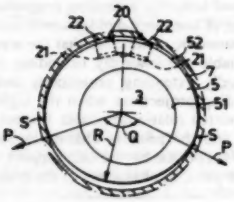
pressure roll in each unit; subsequently after exchanging the pressure rolls, raising each of the plates to the upper level; shifting the units in the first direction another one-fourth of the distance between the printing units; lowering the raised plates so that the carriages containing the new engraved cylinders are positioned in each of said units; and then starting the press again to continue printing.

4,502,385

ARRANGEMENT FOR STABILIZING AN ECCENTRIC BEARING BUSH

Bo R. J. Carlén, Sollentuna, and Sven A. Arwidsson, Dingle, both of Sweden, assignors to Solna Offset AB, Sollentuna, Sweden

Filed Sep. 30, 1982, Ser. No. 428,578
Claims priority, application Sweden, Oct. 2, 1981, 8105831
Int. Cl.³ B41F 7/02
U.S. Cl. 101—218 **10 Claims**



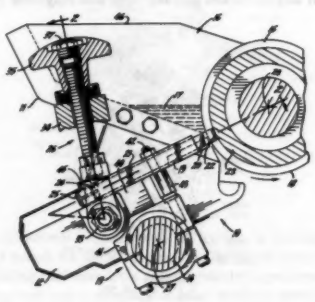
1. An arrangement for stabilizing an eccentric bearing bush for a printing cylinder bearing, said bush rotatably positioned in a right circular cylinder bearing hole rotatably accommodating the bush in a side frame of a printing press, the bearing bush being a right circular cylindrical surface along the greater part of its circumference, the remaining smaller part of its circumference being at a shorter radial distance from the center of curvature of the larger circumferential portion, said bearing hole and said bearing bush thereby providing mutually contiguous surfaces of the bearing bush and bearing hole having contours which provide mutual contact between the surfaces along two areas substantially parallel to the axis of the bearing hole, the contact areas positioned outside the range of movement for a resultant to the forces normally acting on the printing cylinder during operation of the press, and with an angular distance to each other which is less than 180° degrees, said areas being separated in the circumferential direction by gaps between an outer surface of the bush and an inner surface of the bearing hole, said gaps separated in the circumferential direction by said two areas.

4,502,386

INK FOUNTAIN HAVING TEMPERATURE RESPONSIVE ELEMENT

Bert Cappel, Muhlheim; Helmut Kerber, Rodermark; Siegfried Schuhmann, Offenbach am Main, and Gerd Steiner, Heusenstamm, all of Fed. Rep. of Germany, assignors to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed May 13, 1983, Ser. No. 494,172
Claims priority, application Fed. Rep. of Germany, May 13, 1982, 3218045
Int. Cl.³ B41F 31/04, 31/06; B41L 27/08
U.S. Cl. 101—350 **19 Claims**



1. In a printing press having a main frame, an ink fountain comprising a sub-frame mounted on the main frame and defining a trough for containment of ink, a slow-rotated fountain roller journaled with respect to the main frame in position to form one side of the trough, a fountain blade secured to the sub-frame and oriented with the tip of the blade spaced from the surface of the fountain roller, means for pivotally supporting the sub-frame on the main frame for movement about a pivot axis substantially parallel to the axis of the fountain roller so that the pivot angle of the sub-frame with respect to the main frame uniformly establishes the spacing along the length of the blade, means for adjusting the spacing between the blade and fountain roller to establish the thickness of the ink film fed by the by the blade to the surface of the fountain roller, said adjusting means including means responsive to temperature variations for adjusting the spacing between said blade and said fountain roller for maintaining a substantially constant ink film thickness fed by the blade during such temperature variations, said temperature-responsive adjusting means including a temperature-responsive element interposed between the sub-frame and main frame at a point removed from the pivot axis, said temperature-responsive element having a coefficient of linear thermal expansion and length selected to change the pivot angle and thus said blade spacing by a predetermined amount as a function of temperature so that the thickness of the ink film fed by the blade is substantially constant even under extreme temperature variations.

4,502,387

DEVICE FOR ZONE-WISE METERING OF INK ON AN INK DUCT ROLLER OF AN INKING UNIT FOR PRINTING PRESSES

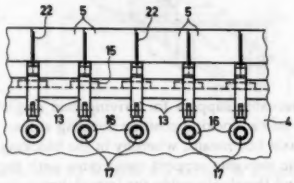
Willi Jeschke, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Oct. 24, 1983, Ser. No. 544,593

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1982, 3239259

Int. Cl.³ B41F *31/06*

U.S. Cl. 101—365 11 Claims



1. Device for zone-wise metering of ink on an ink duct roller of an inking unit for printing presses, with an ink knife sealed against flowthrough of ink and subdivided zone-by-zone into adjacent elements having respective mutual joints therebetween, comprising respective actuators located at the mutual joints between the ink knife elements, said actuators being operable upon the respective two neighboring ink knife elements on either side of the respective mutual joints for varying zone-by-zone the width of a gap located between the ink knife and the ink duct roller.

4,502,388

PLATE HOLDING DEVICES FOR OFFSET DUPLICATOR

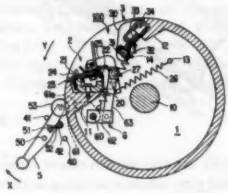
Koji Ishii, Fuchu, Japan, assignor to Ryobi Limited, Fuchu, Japan

Continuation of Ser. No. 425,888, Sep. 28, 1982, abandoned. This application Mar. 30, 1984, Ser. No. 595,633

Claims priority, application Japan, Sep. 30, 1981, 56-146232

Int. Cl.³ B41F *27/12*

U.S. Cl. 101—415.1 7 Claims



1. A plate holding device for an offset duplicator, comprising:

a machine frame;

a plate cylinder supported for rotation about its axis by the machine frame and having a pair of axially extending, circumferentially spaced shoulders, a portion of said plate cylinder between said shoulders being removed to form an opening;

a tail clamp member on one of the shoulders for clamping a tail edge of a printing plate;

a clamp plate for clamping a leading edge of the printing plate, the clamp plate being hinged to the other one of the shoulders;

first spring means associated with the plate cylinder for biasing the clamp plate to a clamping position;

a rotation shaft supported to extend through one side surface of the plate cylinder for rotation about the axis of the rotation shaft;

an inner operating plate fixed to the rotation shaft inside the plate cylinder;

a link bar inside the plate cylinder for interconnecting the inner operating plate and the clamp plate so that the clamp plate is operated in response to rotation of the inner operating plate by the rotation shaft;

an outer operating plate fixed to the rotation shaft outside the plate cylinder in the region of said one side surface of the plate cylinder, the outer operating plate having a first side surface wherein a force applied to said first side surface causes the rotation shaft to rotate in a direction to open the clamp plate;

an operating handle pivoted to the machine frame to engage the outer operating plate so as to swing the clamp plate through the rotation shaft, the inner operating plate and the link bar when the operating handle is pivoted from an initial to an operating position; and

handle setting means on the machine frame for fixing the operating handle at a selected one of the initial and the operating positions;

and the handle in its operating position and the outer operating plate comprising means for actuating the clamp to open as the plate cylinder is rotated in a given direction and also for actuating the clamp to close as the plate cylinder is rotated in a direction opposite said given direction.

4,502,389

TRACK WORK TRAIN

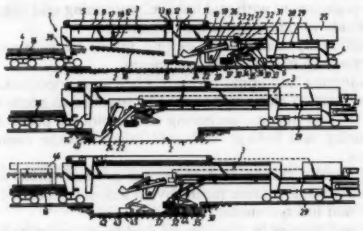
Josef Theurer, Vienna, and Manfred Brunninger, Linz, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Jul. 15, 1981, Ser. No. 283,458

Claims priority, application Austria, Jul. 24, 1980, 3845/80; Feb. 6, 1981, 556/81

Int. Cl.³ E01B *27/00, 27/02, 27/08*

U.S. Cl. 104—2 25 Claims



1. A track work train for reconditioning a ballast bed supporting the track and resting on a layer of sand on a sub-grade, the train comprising a track building vehicle and a plurality of freight cars interconnected for common movement along the track, the track building vehicle including an elongated frame extending in the direction of the track and two undercarriages spaced apart in said direction and supporting the vehicle frame for movement on the track, a hoist means mounted on the vehicle frame between the undercarriages and capable of lifting an assembled track section off the ballast bed, the vehicle frame spanning a ballast bed reconditioning zone resulting from the lifting of the assembled track section off the ballast bed, a vertically adjustable ballast bed excavating means mounted on the vehicle frame rearwardly of the hoist means in said direction and a conveyor band associated with the excavating means for sequentially conveying sand and ballast to the reconditioning zone, the conveyor band comprising a portion for sequentially discharging and distributing the conveyed sand and ballast in said zone, guide track means on the vehicle

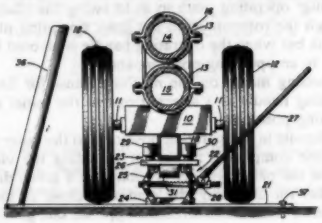
frame for displaceably supporting the hoist means as well as the excavating means and the associated conveyor band for movement along the vehicle frame in said direction, and drive means for separately displaceing the hoist means and the excavating means along the guide track means.

4,502,390

SELF-ELEVATING ACUTE TURN GUIDE HOSE HAULER VEHICLE

Ricky L. Shaw, Bethel Park, Pa., assignor to Conoco Inc., Ponca City, Okla.

Filed Mar. 3, 1982, Ser. No. 354,333
Int. Cl.³ B61F *9/00*
U.S. Cl. 104—245 **1 Claim**



1. A method for assisting a hose hauler negotiate a change in direction, wherein said hose hauler includes at least a plurality of wheel supported carts which are interconnected by a linkage which also extends under said carts, said method comprising:

(a) inserting where said change in direction is to be instituted a pressure support plate having a jack supported linkage capture means attached thereto under said linkage between said carts in a manner to position said linkage capture means under said linkage,

(b) anchoring said pressure support plate,

(c) raising by said jack, said linkage capture means vertically into engagement with said linkage, restraining said linkage from side to side movement,

(d) additionally raising said jacking means by an amount necessary to level said linkage means,

(e) positioning additional pressure plate supported linkage capture means along said change in direction as needed to restrain said linkage, anchoring said additional plates and capturing said linkage with said raised linkage capture means,

(f) additionally raising said additional pressure plate supported linkage capture means by an amount necessary to level said linkage means,

whereby said change in direction of said hose hauler can be stabilized throughout the total length of said hose hauler directional change.

4,502,391

RAILWAY TRACK WORKING MACHINE EQUIPPED WITH A DEVICE FOR BLOCKING THE SUSPENSION OF ITS AXLES

Hans Hurni, Ecublens, Switzerland, assignor to SIG Societe Industrielle, Neuhausen-Chutes du Rhin, Switzerland

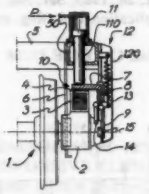
Filed Sep. 30, 1981, Ser. No. 307,303
Int. Cl.³ B61F *5/36*; E01B *27/00*
U.S. Cl. 105—157 R **3 Claims**

1. A railway track working machine having a chassis, wheeled axles for rolling on the railway track, suspension means for supporting the chassis, a plurality of axle box means for connecting said wheeled axles to said suspension means, a guard plate for each of said axle box means, and a device for blocking the suspension means of said wheeled axles comprising, for each said axle box means:

(a) one single guide rigidly fixed to said chassis in the vicinity of said axle box means, said single guide being independent of the guard plate;

(b) one single movable support mounted on said single guide for movement towards and away from said axle box means; and

(c) one single motor member in communication with said



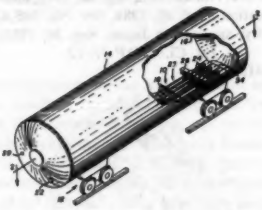
single movable support for driving said single movable support into a blocking position abutting at least a portion of said axle box means, whereby in the blocking position, the single movable support cooperates with the axle box means and the single guide for immobilizing the axle box means in the vertical, transverse and longitudinal directions.

4,502,392

HEAT TRANSFER APPARATUS FOR TRANSPORTABLE LIQUID CONTAINERS

Leonard S. Rosenberger, Saratoga, Calif., assignor to Kaydee Engineering, Inc., Saratoga, Calif.

Division of Ser. No. 269,386, Jun. 1, 1981, Pat. No. 4,415,018.
This application Jun. 17, 1983, Ser. No. 505,333
Int. Cl.³ B61D *27/00*; F28F *1/10, 5/00*
U.S. Cl. 105—451 **5 Claims**



1. In a railroad tank car the improvement comprising:

a continuous finned pipe means extending within the interior of the tank including an intermediate pipe array of a plurality of parallel open loops extending along an axis of motion of the tank, said pipe means further including inlet means and outlet means for flexibly coupling said intermediate array with the tank;

a support structure rigidly engaged with the interior of the tank and slidably engaged with the pipe means for slidably supporting the continuous finned pipe means; and

shock absorbing means rigidly engaged with the tank and resiliently engaged with the pipe means about each end thereof for absorbing shocks delivered to the pipe means the shock absorbing means comprising a plurality of shock absorbers, each shock absorber including means for engaging a loop of the intermediate pipe array, a pair of telecoping cylinders, compression spring means for limiting the degree of telescoping of said cylinders and support means for rigidly attaching said cylinders to the tank.

4,502,393

WORKTABLE, PARTICULARLY AN OFFICE DESK

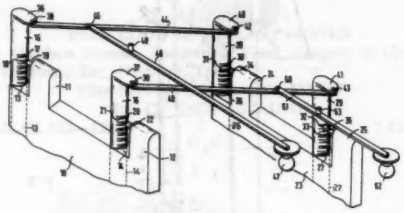
Josef Kaiser, Karben, Fed. Rep. of Germany, assignor to Konig & Neurath Kommanditgesellschaft, Fed. Rep. of Germany

Filed Jan. 28, 1983, Ser. No. 461,732

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1982, 3237252

Int. Cl.³ A47B *27/14, 9/20*

U.S. Cl. 108—1 **16 Claims**



1. Worktable having a table top which is adjustable as to height and angle of inclination and a base, said table top being supported on four vertically adjustable support columns in said base, two columns forming a pair of front columns (**16, 29**) and two columns forming a pair of rear columns (**15, 28**), each pair of columns being adapted to be jointly rotatably and vertically adjustable in guide means in said table frame, characterized in that all of said support columns (**15, 16, 28, 29**) are provided with pivot means rigidly attached to the upper ends thereof and having latch receptacles (**17, 20, 30, 32**) spaced on one side along their longitudinal direction for receiving in a latched position locking pins (**19, 22, 34, 35**) disposed in said table frame and resiliently urged against said columns by compression springs (**55**), and that a control lever (**44**) is connected to the pivot means of said pair of rear columns (**15, 28**) and a control lever (**49**) is connected to the pivot means of said pair of front columns (**16, 29**) to enable each pair of columns (**15, 28** and **16, 29**) to be turned, to disengage said latch receptacles from said locking pins and, upon adjustment of each pair of columns, to re-establish the latched position.

4,502,394

TABLE WITH ADJUSTABLE TABLE-TOP

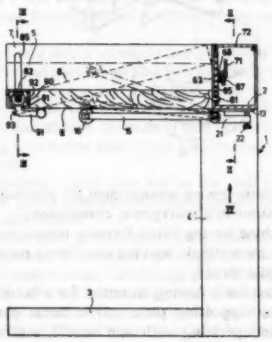
Wolf Veyhl, Neuweiler, Fed. Rep. of Germany, assignor to Veyhl-Produktion KG, Neuweiler, Fed. Rep. of Germany

Filed May 12, 1982, Ser. No. 377,404

Claims priority, application Fed. Rep. of Germany, May 20, 1981, 3120126; European Pat. Off., Sep. 3, 1981, 81106873.3

Int. Cl.³ A47B *17/02*

U.S. Cl. 108—6 **20 Claims**



1. An adjustable table,

comprising a table-top component,

a trestle component,

connecting means for connecting said table-top component to said trestle component for height adjustment of at least a portion of said table-top component,

and spring means between said components for counterbalancing the weight of the table-top component,

said spring means comprising a torsion bar spring,

mounting means for mounting said spring on one of said components,

said torsion bar spring having two opposite end portions and a central portion,

said torsion bar spring having two parallel arms mounted on said opposite end portions of said spring and engaging one of said components,

said torsion bar spring having a third arm on said central portion of said spring and engaging the other component,

whereby said torsion bar spring and said arms resiliently exert counterbalancing force between said trestle component and said table-top component.

4,502,395

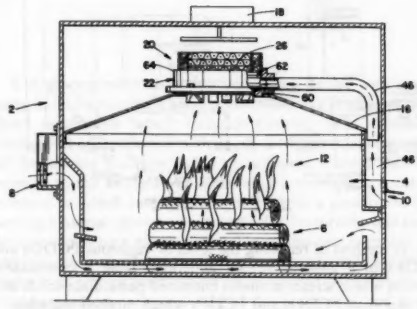
COMBUSTION GAS MIXING APPARATUS

Stockton G. Barnett, Garrettsville, Ohio, assignor to Condar Co., Hiram, Ohio

Continuation of Ser. No. 413,502, Aug. 31, 1982, abandoned. This application May 1, 1984, Ser. No. 604,609

Int. Cl.³ F23J *15/00*

U.S. Cl. 110—214 **12 Claims**



1. An effluent gas burning apparatus adapted to be placed downstream of a primary combustion chamber, which burns a fuel with primary combustion air, to burn in a secondary combustion the effluent gas of the primary combustion chamber, comprising:

an apertured holder positioned downstream of an associated primary combustion chamber and adapted to have the effluent gas flow through a plurality of apertures thereof, said holder including a plurality of integral fins for creating turbulence in the effluent gas flowing through said holder;

a secondary combustion air delivery member which is positioned within said holder and downstream of said fins, said delivery member including a plurality of spaced apertures through which secondary combustion air is introduced into the effluent gas, said apertures being graduated in size becoming progressively larger the further they are positioned from said inlet port to evenly distribute said secondary combustion air and create a homogeneous mixture of said effluent gas and said secondary combustion air; and,

a catalytic combustor positioned downstream of said delivery member for combusting said homogenous mixture.

3. A method of delivering gases containing unburned chemi-

cal compounds to a catalyst for subsequent combustion comprising the procedural combination of steps of:

providing a primary combustion air source to a fuel contained in a combustion chamber;

burning the fuel thereby producing combustion gases containing unburned chemical compounds;

directing the gases to a plurality of finned turbulence causing members which produce turbulence in the gases;

subsequently introducing a plurality of streams of secondary air through an apertured air discharge member located downstream of said finned members which produce turbulence;

providing a plurality of differently sized apertures in said apertured discharge member so that a uniform volume of said secondary air is ejected through each of said plurality of apertures of said apertured air discharge member;

homogeneously mixing the plurality of streams of secondary air with the combustion gases; and,

subsequently introducing the mixed secondary air and combustion gases into the catalyst.

4,502,396

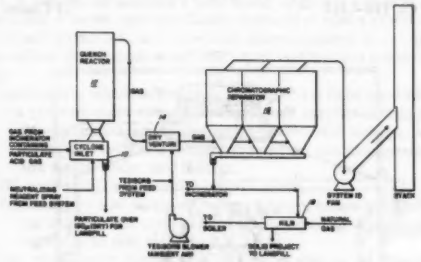
CONTROL OF DIOXIN EMISSIONS FROM INCINERATION

Aaron J. Teller, Palm Beach, Fla., assignor to Teller Environmental Systems, Inc., Shrewsbury, Mass.

Filed Apr. 25, 1983, Ser. No. 488,131

Int. Cl.³ F23G *3/00*

U.S. Cl. 110—346 **8 Claims**



1. A method of reducing the level of vaporous PCDDs and PCDFs in a gaseous stream generated from a combustion process which stream contains entrained particulate solids and the vaporous PCDDs and PCDFs which method includes:

lowering the temperature of the gaseous stream to between about 100°–110° C. to cause a major proportion of the PCDDs and PCDFs originally present in the vapor phase to be condensed on the particulate solids; and

removing the particulate solids containing the condensed PCDDs and PCDFs from the gaseous stream.

4,502,397

PRE-DRYING FUEL IN STEAM GENERATOR WITH INTEGRAL DOWN-DRAFT DRYER

Frank W. Hochmuth, P.O. Box 186, Brewer, Me. 04412

Continuation-in-part of Ser. No. 523,375, Aug. 15, 1983, Pat. No. 4,480,557, which is a continuation-in-part of Ser. No. 333,834, Dec. 23, 1981, abandoned. This application Jul. 18, 1984, Ser. No. 631,865

Int. Cl.³ F23G *5/00*

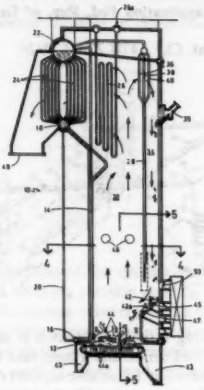
U.S. Cl. 110—346 **4 Claims**

1. The method of pre-drying wet fuel to be fed onto and or above the grate of the combustion chamber of a furnace which comprises

providing a combustion-free drying shaft offset from said combustion chamber

introducing some of the hot gases from the combustion chamber together with wet fuel to be dried into the upper portion of said shaft, thereby cooling said gases and increasing their density relative to the gases in said combustion chamber

whereby a downward concurrent flow of falling fuel and gases cooled thereby is created in said shaft, and



laterally deflecting and distributing the thus dried fuel to from the lower portion of said shaft into the lower end of said combustion chamber onto and above said grate while recycling the cooled gases through said combustion chamber.

4,502,398

THROAT PLATE FOR A DOUBLE LOCKSTITCH AUTOMATIC SEWING ARRANGEMENT

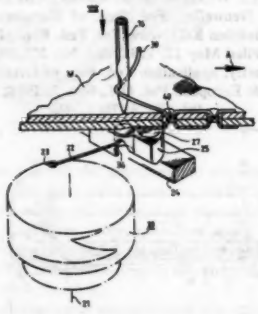
Wilfried Goldbecker, Steinhagen, Fed. Rep. of Germany, assignor to Kochs Adler AG, Bielefeld, Fed. Rep. of Germany

Filed Mar. 9, 1983, Ser. No. 473,735

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1982, 3208779

Int. Cl.³ D05B *21/00, 73/12*

U.S. Cl. 112—121.12 **3 Claims**



2. An automatic sewing arrangement for producing a double lockstitch contour in a workpiece, comprising:

a sewing machine having stitch forming means including:

a needle reciprocatingly moving on a linear path and carrying a needle thread;

a vertical axis hook having an outlet for a hook thread;

a workpiece supporting plate and a throat plate with an aperture cooperating with said needle, said throat plate comprising a workpiece supporting area of substantially circular geometry and an opposite area;

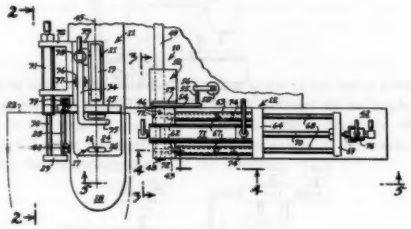
a workpiece receiving device; and
control means generating a feed movement as a relative motion between said needle and said workpiece according to a predetermined program;
said aperture comprising:
an opened area arranged at said opposite area formed by a thread guiding edge extending from said opposite area towards said workpiece supporting area and terminating in an angular edge extending back to said opposite area, said angular edge being inclined to said opposite area.

4,502,399

BELT LOOP SEWING APPARATUS

A. Matthew Seaman, Brentwood, Tenn., assignor to Cutters Exchange, Inc., Nashville, Tenn.

Filed Sep. 19, 1983, Ser. No. 533,537
Int. Cl.³ D05B *3/12, 35/00*
U.S. Cl. 112—121.27 **7 Claims**



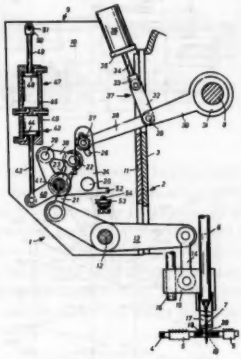
1. An apparatus for securing a belt loop to a garment, comprising;
(a) a securing station including a platform, having a longitudinal axis, for supporting a garment, and securing means for attaching to the garment in a securing position longitudinally of said platform, a belt loop having opposite ends,
(b) means for shifting the garment longitudinally on said platform to permit the securing means to attach each end of the belt loop to the garment,
(c) a belt loop loading device mounted adjacent said securing station,
(d) said loading device comprising a receiver head adapted to receive a belt loop strip substantially parallel to said longitudinal axis, in a loading position,
(e) a feeder device for feeding a belt loop strip of predetermined length to said loading position,
(f) a pair of parallel hollow tubular guide members fixed to said receiver head and projecting transversely away from said securing station,
(g) an elongated turning rod reciprocably received coaxially within each of said tubular guide members, each rod having a free end proximal to said securing station,
(h) a turning finger member projecting from each of said free ends,
(i) said turning finger members being adapted to receive the opposite end portions of said belt loop strip in said loading position, to carry said belt loop strip to said securing station as said turning rods move toward said securing station, and to turn the ends of said belt loop strip, as said turning rods rotate about their longitudinal axes, to form a belt loop,
(j) an elongated spiral cam slot in the wall of each of said tubular guide members, having opposite spiral directions from each other,
(k) a cam member projecting radially from each turning rod and received in said corresponding spiral cam slot,
(l) linear motor means for driving said turning rods simultaneously between a retracted position in which said turning finger members are in registry with said receiver head for receiving said belt loop strip in said loading position, and a protracted position in which said turning finger members deliver the belt loop in said securing station, the end portions of said belt loop strip being turned in opposite directions by said turning finger members as said turning rods travel between said retracted position and said protracted position.

4,502,400

SEWING MACHINE WITH A TRIMMING DEVICE

Karl H. Walther, Weilerbach, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Nov. 3, 1982, Ser. No. 438,803
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1981, 3144965
Int. Cl.³ D05B *37/06*
U.S. Cl. 112—122 **5 Claims**



1. A sewing machine having a trimming device with a trimming knife for trimming sewing material and a sewing machine drive mechanism which includes a swing lever connected through an eccentric rod with an eccentric arranged on a shaft of the sewing machine and a transmission element movable relative to the swing lever said swing lever having a cutting position in which said trimming knife is in a position to trim sewing material, and an adjusting device for turning said swing lever comprising a member movable against said eccentric rod to pivot said swing lever into a position corresponding substantially to its cutting position and for fixing said swing lever in its cutting position, independently of the position of said eccentric, whereby said trimming knife can be driven by means undependent of said sewing machine drive.

4,502,401

ELECTRONIC SEWING MACHINE

Yoshimi Asai; Michitaka Takiguchi, and Fujio Horie, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

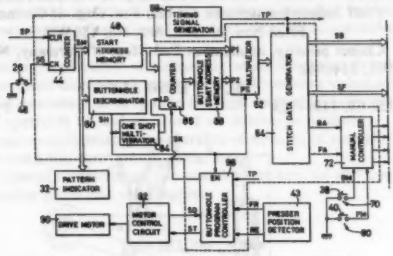
Filed May 16, 1983, Ser. No. 494,682
Claims priority, application Japan, Jun. 4, 1982, 57-96673
Int. Cl.³ D05B *3/06, 3/02*
U.S. Cl. 112—158 B **4 Claims**

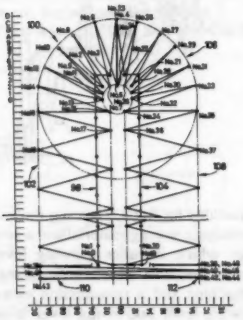
1. An electronic sewing machine having actuating means for varying a relative position of a needle and a workpiece in accordance with stitch data which influences each stitch of a buttonhole, comprising:
data generating means, operative in timed relation with reciprocation of said needle, for generating stitch data related to each stitch of a predetermined buttonhole having a circular stitching part at its end;
adjusting means operative to adjust the stitch data received from said generating means;
changeover means capable of switching between an auto-

matic condition and a manual condition to thereby render said adjusting means inoperative and operative, respectively;

manually operated means operable to select one of said automatic and manual conditions;

control means for selectively generating one of an automatic setting signal and a manual setting signal in accordance with operation of said manually operated means, said automatic setting signal and said manual setting signal





being effective to set said changeover means in said automatic condition and said manual condition, respectively;

commanding means for generating an inhibition command in timed relation with generation of said stitch data related to said circular stitching part; and

said control means being responsive to said inhibition command for stopping the generation of said manual setting signal and generating said automatic setting signal in place of said manual setting signal.

4,502,402

SEWING MACHINE WITH PATTERN EDITING FUNCTION

Kenji Kato, Tokyo, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed Jul. 14, 1983, Ser. No. 513,979

Claims priority, application Japan, Jul. 15, 1982, 57-122082

Int. Cl.³ D05B *3/02*

U.S. Cl. 112—158 E **2 Claims**

1. An electronic sewing machine with a pattern forming device which changes a relative position between a needle of the sewing machine and a fabric to be sewn, and forms stitched patterns, which comprises:

first memory means for storing stitch control signals for controlling said pattern forming device to produce stitches of the patterns;

indicating means indicating a plurality of patterns;

pattern selecting means including a plurality of pattern-selecting switches selectively operated in reference to indicated patterns to select desired patterns from said first memory means;

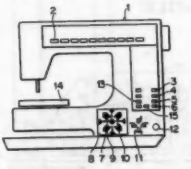
said indicating means being activated in response to selective operations of said pattern-selecting switches to sequentially indicate the selected patterns;

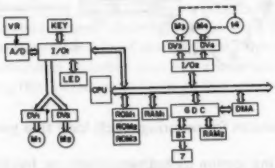
second memory means for storing indication signals of the selected patterns indicated of said indicating means;

pattern adjusting means including a plurality of accessible members selectively operated to adjust and correct the position and inclination of the patterns indicated on said indicating means;

third memory means for temporarily storing signals activated in response to said indication signals to operate said indicating means;

signal control means being responsive to said indication signals read out from said second memory means to trans-





mit and read out said indication signals into and from said third memory means under a control of said adjusting means and to rewrite the signals stored in said third memory means in response to the operation of said pattern adjusting means; and

pattern editing program control means to programmingly control the reading-out of said indication signals from said second memory means, the operation of said signal control means, the signal storing of said third memory means, the rewriting of the signals stored in said third memory means by said signal control means, the reading-out of said stitch control signals from said first memory means, and a temporary memorizing of the operations of all above mentioned means;

so as to combine the corrected patterns and form a composite pattern.

4,502,403

TUFTING MACHINE NEEDLES

Garth A. Carnaby, Papanui, New Zealand, assignor to Wool Research Organization of New Zealand (Inc.), Canterbury, New Zealand

Filed Aug. 1, 1983, Ser. No. 518,841

Claims priority, application New Zealand, Aug. 2, 1982, 201452

Int. Cl.³ D05C *15/20*

U.S. Cl. 112—222 **9 Claims**

2. A needle for tufting, sewing, stitching and the like machines, the needle including a shaped elongate blade having at one end thereof a shank and at the other end thereof a point adjacent to which is positioned a needle eye, the elongate blade and the point having a shaped path formed therein above the needle eye and on the point, the path being defined as a longitudinal input recess located in one side of the blade above the eye and a cutaway portion on a side of a region of the point opposite said one side on which the longitudinal recess is located,

the input recess having a sloped region immediately above the eye which is in the same plane as a bias of the shank of the needle, the path allowing substantially unimpeded movement of yarn through the needle eye when the needle is withdrawn in an upward direction, the path being so shaped and dimen-

sioned as to produce a needle deflection angle of not more than 13 degrees, the deflection angle being defined as an angle between the axis of a measuring rod having a diameter of exactly 0.3 times the maximum lengthwise extent of the needle eye and the longitudinal axis of the needle.

4,502,404

UPPER THREAD CUTTING UNIT IN BUTTONHOLE SEWING MACHINES

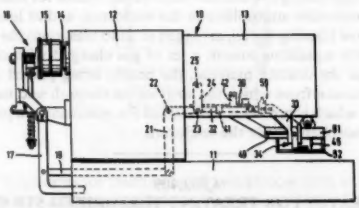
Flavio Bisson, Cava Manara PV, Italy, assignor to Necchi Societa per Azioni, Pavia, Italy

Filed Oct. 6, 1983, Ser. No. 539,390

Claims priority, application Italy, Oct. 28, 1982, 42917 A/82

Int. Cl.³ D05B *65/02*

U.S. Cl. 112—294 **3 Claims**



1. An upper thread cutting unit in a buttonhole sewing machine having a needle, comprising a first rod, connectable to a stop device of the sewing machine, a substantially L-shaped lever joined to said first rod, an element pivotally mounted and pivotally connected to said L-shaped lever, a support member pivotally mounted on said element and defining a pin extending therefrom, a second rod defining a slot therein into which said pin slides, a support for thread cutting means fixed to said second rod, a first means for connecting said second rod to said support member and second means for taking said thread cutting means under and away from said needle.

4,502,405

FLOATING DEVICE COMPRISING STORAGE HOLDS FOR BULK FREIGHT, SUCH AS A HOPPER DREDGE

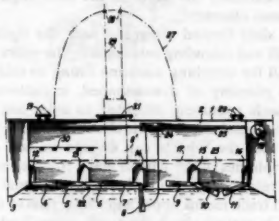
Hendrik Langejan, Krimpen a.d. Lek, Netherlands, assignor to IHC Holland N.V., Papendrecht, Netherlands

Filed Nov. 10, 1981, Ser. No. 320,292

Claims priority, application Netherlands, Nov. 11, 1980, 8006153

Int. Cl.³ B63B *35/30*

U.S. Cl. 114—26 **6 Claims**



1. In a hopper dredge comprising a horizontally elongated storage hold for storing dredged material and a series of valves in the bottom of the hold extending lengthwise of the hold for discharging said dredged material, the water level in the hold being normally above the valves; the improvement comprising means for closing the storage hold substantially air tight, and means for generating an overpressure in the closed storage hold to bring said valves above the water level for inspection or repair of said valves.

4,502,406

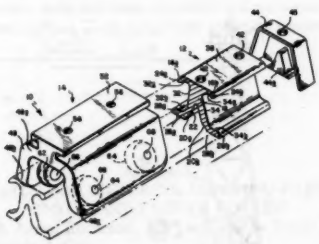
ROLLER TRAVELER ASSEMBLY

Carl A. Merry, Marion, Mass., assignor to Schaefer Marine, Inc., New Bedford, Mass.

Filed Aug. 9, 1982, Ser. No. 406,551

Int. Cl.³ B63H *9/10*

U.S. Cl. 114—204 **4 Claims**



1. A traveler assembly comprising

A. track means having

(1) means defining a pair of oppositely disposed, laterally open, mirror-image, C-shaped channels

(a) extending the length of the track means, and

(b) being canted upwardly inwardly at an angle from the vertical, the upper and lower walls of said channels defining upper and lower concave-in-cross-section rails;

(2) means defining a longitudinal groove in the underside of said track means which extend between said channels;

(3) a pair of laterally projecting flanges

(a) underlying said channels, and

(b) extending along substantially the entire length of the track means; and

(4) a cross section which is generally I-shaped with

(a) the body of the I being progressively thicker from top to bottom, and

(b) the lower arms of the I extending laterally beyond the upper arms thereof; and

B. a car, said car including

(1) a generally U-shaped rigid member having a top wall and a pair of depending splayed side walls straddling said track means, the splay angle of the side walls being substantially the same as the cant angle of the track means channels;

(2) a slide formed integrally with the rigid member top wall and extending substantially the entire length of that wall for attaching a marine fitting to said top wall;

(3) a plurality of donut-shaped, impact-resistant plastic wheels rotatively mounted to axles anchored in said rigid member side walls at the inboard surfaces thereof so that the wheels can engage in said channels, the peripheries of the wheels being rounded more or less in correspondence with the cross-sectional curvature of said track means upper and lower rails so that, when the car is moved along the track means under vertical or lateral loads transmitted through said slide, said wheels make line contacts with said upper or lower rails; and

C. longitudinal bridge means having

(1) a top wall;

(2) a pair of side walls depending from the opposite side edges of the top walls; and

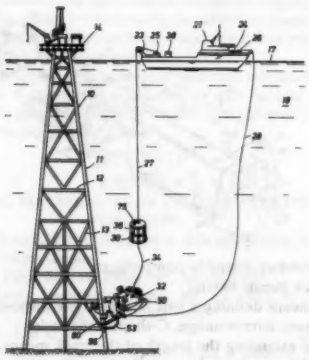
(3) an upwardly-facing keyway extending along the length of the bridge means top wall for slidably receiving said flanges so that the track means can be supported by the bridge means.

4,502,407

METHOD AND APPARATUS FOR CLEANING, VIEWING AND DOCUMENTING THE CONDITION OF WELDMENTS ON OFFSHORE PLATFORMS

James W. Stevens, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 12, 1982, Ser. No. 367,488
Int. Cl.³ B63G *8/00*
U.S. Cl. 114—222 **4 Claims**



2. Apparatus adapted to be used with a remotely-controlled underwater vehicle operating on a tether cable from a remote location to clean, view and photograph selected area of an underwater structure, said apparatus comprising:

a tool body adapted to be secured and operatively connected to the lower portion of said underwater vehicle;

remotely-actuatable anchoring means operatively carried by said tool body;

a remotely-actuatable, flexible, pivotable, articulated cleaning arm extending from said tool body;

a cavitation jetting tool carried at the extended end of said cleaning arm;

a remotely-actuatable, flexible, pivotable, articulated viewing arm independent of said cleaning arm and extending from said tool body;

remotely-actuatable television camera means and its associated light means carried at the end of said viewing arm; and

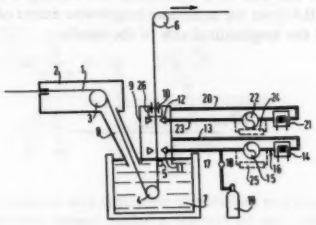
remotely-actuatable photographic camera means and its associated light means carried at the end of said viewing arm adjacent to said television camera means.

4,502,408

INSTALLATION FOR THE CONTINUOUS COATING OF A STRIP, ESPECIALLY FOR THE GALVANIZING OF SHEET STEEL

Jean-Paul Hennechart, Mouzon; Bernard Bramaud, Nanterre, and Francois Prat, Mouzon, all of France, assignors to Ziegler S.A., Paris, France

Filed Apr. 5, 1984, Ser. No. 597,049
Claims priority, application France, Apr. 13, 1983, 83 06055
Int. Cl.³ B05C *3/12*
U.S. Cl. 118—61 **10 Claims**



1. An installation for the continuous coating of a strip, comprising means for successively causing the strip to enter and pass through a molten bath of coating material and for causing the strip to leave the bath in an ascending and approximately vertical direction; means for equalizing the thickness of liquid coating material carried by the strip on leaving the bath; an enclosure surrounding the equalizing means, said enclosure being open towards the bottom and having side walls which dip into the bath, and having an upper wall provided with a narrow slit through which the strip leaves; means for maintaining a protective atmosphere in the enclosure; and at least one nozzle for blasting nuclei, arranged so as to blast onto the strip, above the equalizing means, a jet of gas charged with crystal nuclei of the coating material, the nozzle being placed inside the enclosure from which the strip leaves through said narrow slit and which is provided with means for maintaining a protective atmosphere inside the enclosure.

4,502,409

APPARATUS FOR TREATING TEXTURIZED STRANDS AND YARNS

Brian D. Perry, and Paul K. Mathews, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Oct. 1, 1981, Ser. No. 307,559
Int. Cl.³ B05C *3/12*
U.S. Cl. 118—410 **3 Claims**

1. Apparatus for collecting a strand comprising:

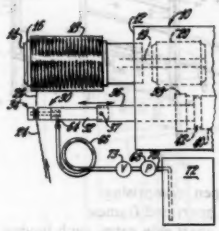
a rotatable mandrel adapted to wind said strand thereabout;

an applicator section having a coating supply orifice, a passage in communication with said orifice, and a guide

means adapted to receive said strand advancing therethrough;

a manifold section adapted to reciprocably move along the axis of rotation of said mandrel, said manifold section having a bore adapted to receive said applicator section and a passageway in communication with said passage of said applicator section;

releasable fastener means to join said applicator section to said manifold section;



means for supplying a liquid coating to said passageway of the manifold section to supply said orifice to coat said strand;

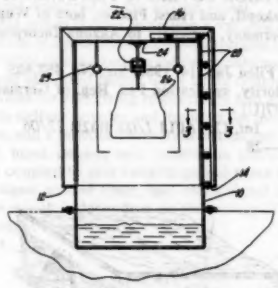
means for moving said manifold section to move the strand advancing to said mandrel such that said strand is collected on said mandrel in helically wound, overlapping layers.

4,502,410

ENCLOSURE FOR TREATMENT TANK

Joseph D. Donahue, Troy, Mich., assignor to Haden Schweitzer Corporation, Madison Heights, Mich.

Filed Nov. 7, 1983, Ser. No. 548,986
Int. Cl.³ B05B *15/00, 15/04*
U.S. Cl. 118—429 **10 Claims**



1. Apparatus for treating metal workpieces such as automobile bodies and automobile body components with a liquid, said apparatus being of the type which includes a tank having upper extremities on the opposite lateral walls thereof; an enclosure for said tank comprising:

a framework made up of a plurality of rigid bents mounted on said tank and extending in a generally U-shaped configuration over said tank and at spaced intervals therealong;

a plurality of anchor plates of non-corroding material secured internally of said bents; and

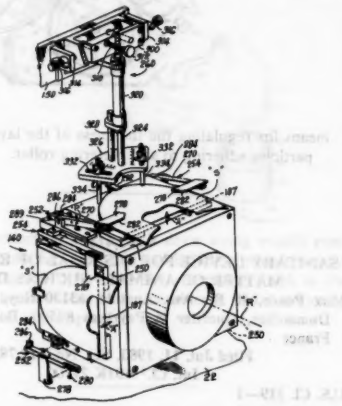
a plurality of panels of non-corroding, non-metallic material secured to and extending between said plates to finish said enclosure and to isolate said bents from said liquid and vapors and sprays thereof.

4,502,411

CLAMPING MECHANISM FOR A POWDER REINFORCING MACHINE

Andrew J. Gilbride, Swampscott; Albert I. Morse, Beverly; Douglas H. Crowell, Beverly, and Larry L. Holland, Beverly, all of Mass., assignors to USM Corporation, Farmington, Conn.

Filed Nov. 30, 1983, Ser. No. 556,270
Int. Cl.³ B05C *13/00*
U.S. Cl. 118—503 **8 Claims**



1. An articulated gripper mechanism for holding a generally planar substrate against a movable base on a rotatable transport mechanism, comprising:

a pair of lever arms arranged on the opposed sides of the movable base, said lever arms pivotable on supports mounted on each planar face of the rotatable transport mechanism;

engagement means on said movable base to cause said lever arms to pivot;

securement means on said lever arms to hold a generally planar substrate against the base; and

said lever arms having a rotatable wheel at one end thereof, in contact with said base, to permit rolling contact therebetween as said lever arm pivots about its support.

4,502,412

APPARATUS FOR METERING MARKING PARTICLES ONTO A DEVELOPER ROLLER

Thomas B. Jones, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 22, 1983, Ser. No. 487,479
Int. Cl.³ G03G *15/09*
U.S. Cl. 118—658 **10 Claims**

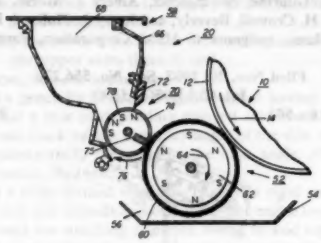
1. An apparatus for developing a latent image with magnetic marking particles, including:

a developer roller for transporting magnetic carrier granules having the marking particles adhering triboelectrically thereto closely adjacent to the latent image so that the latent image attracts a portion of the marking particles thereto to form a powder image thereof;

an open ended container storing a supply of the marking particles therein;

a magnetic metering roller, positioned in the open end of said container, for dispensing the marking particles from

the open end of said container onto the carrier granules on said developer roller; and



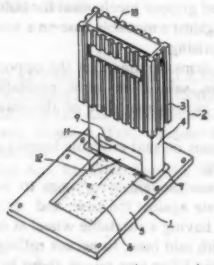
means for regulating the thickness of the layer of marking particles adhering to said metering roller.

4,502,413

SANITARY DEVICE FOR DISPOSAL OF EXCRETORY MATTER OF ANIMALS SUCH AS DOGS

Max Ponce, 40 Bis Ave. Anatole, 63130 Royat, and Gerard Dumarcher, Quartier la Peyreras 84500, Bollene, both of France

Filed Jul. 11, 1983, Ser. No. 512,782
Int. Cl.³ A01K *29/00*
U.S. Cl. 119—1 **15 Claims**



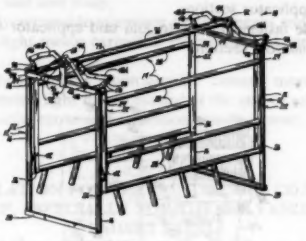
1. In a device of the type described for receiving the excretory matter of animals such as dogs, in which a rolling carpet is provided, disposed on a supporting frame therefor, upon which the animal carries out its natural excretory function, drive means are provided for rolling the carpet about the frame, means are provided for cleaning the excretory matter from the carpet, with the rolling carpet having a surface disposed in an opening in a platform for receiving the excretory matter from the animal, and a column extends upwards from the platform and contains means for controlling the rolling of the carpet about said frame; the improvement wherein said platform includes a border plate surrounding said carpet and said column, said border plate having a collector channel surrounding a foot portion of said column; and said column includes an upper part and a lower part, said lower part having smooth peripheral walls and said upper part forming a peripheral cornice extending completely around and above said lower part; with sluicing channel means being disposed under said cornice at the juncture of said upper and lower parts for distributing liquid onto said smooth walls for rinsing the same, said upper part containing means for feeding in and treating water and supplying the treated water to said sluicing channel means, and said lower part containing said drive means for rolling said carpet.

4,502,414

FARROWING PEN

Nick E. Paulsen, R.R. 2, Center Junction, Iowa 52212

Filed Aug. 19, 1983, Ser. No. 524,754
Int. Cl.³ A01K *1/02*
U.S. Cl. 119—20 **16 Claims**



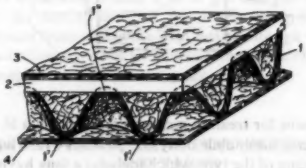
1. A farrowing pen, comprising:
a pair of spaced apart end frames;
a pair of spaced apart side gates, each having an upper and lower edge and each side gate being pivotally connected at opposite ends to said end frames, and
an adjustment means connected to said end frames and said side gates for moving said side gates between a first narrow position and a second wide position with respect to the spacing between said gates;
said side gates being at a higher elevation with respect to said end frames when said side gates are in said second position than when said side gates are in said first position;
said adjustment means including an elongated shaft rotatably mounted at opposite ends to said end frames and having first and second opposite ends, linkage means pivotally connecting said side gates to said shaft, whereby rotation of said shaft moves said side gates between said positions and stop means for preventing rotation of said shaft.

4,502,415

FLOOR COVERING FOR STABLES

Udo Schwarzkopff, and Horst Fischer, both of Wuppertal, Fed. Rep. of Germany, assignors to Akzona Incorporated, Enka, N.C.

Filed Jan. 14, 1983, Ser. No. 458,605
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1982, 8200677[U]
Int. Cl.³ A01J *1/00*; B32B *27/06*
U.S. Cl. 119—28 **6 Claims**



1. A floor covering for stables comprising: a top layer impervious to moisture, a bottom fabric layer and a compressible central layer, said central layer including a matting having a plurality of intersecting filaments with a diameter of from 0.4 to 2.5 mm, fused together at said points of intersection, and with at least one surface exhibiting a honeycomb-like structure having a plurality of rows and columns of humps thereon, each of said humps being spaced apart from each other, the upper surface of said compressible layer being partly embedded in said moisture impervious top layer, and said fabric being

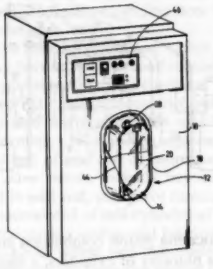
formed from synthetic filaments or fibers, said fabric being connected with said humps of said honeycomb structure.

4,502,416

AUTOMATIC ANIMAL FEEDER

F. Kerry Keysell, Sherborne, and Robert G. Lawrence, Bideford, both of England, assignors to Quantock Veal Limited, Dorset, England

Filed Jul. 7, 1982, Ser. No. 396,097
Int. Cl.³ A01K *5/00*
U.S. Cl. 119—51.11 **11 Claims**



1. A machine for mixing powder and liquid to produce a liquid animal feed mixture, the machine comprising:
- a powder storage hopper;
- a liquid storage tank;
- a mixing vessel including means for mixing powder and liquid therein;
- a motor driven auger mounted beneath the powder storage hopper for delivering powder to the mixing vessel;
- a pump and a liquid supply conduit connected to the tank for delivering liquid to the mixing vessel;
- an outlet in the mixing vessel for conducting a mixture of liquid and powder away from the mixing vessel; and
- electrical control means including a mixture concentration selector for adjusting the relative proportions of powder and liquid delivered to the mixing vessel,
- said control means further including a variable period timer in the form of a presettable counter arranged to be clocked at a variable rate, a fixed period timer, said variable period timer and said fixed period timer being coupled to switching devices for energizing respectively said auger and said pump to deliver powder and liquid to the mixing vessel in batches, and a powder calibration circuit and a calibration weight input device, said calibration circuit having an output coupled to said variable period timer for feeding a clock signal to said timer, said clock signal having a frequency which is dependent on the setting of said calibration weight input device.

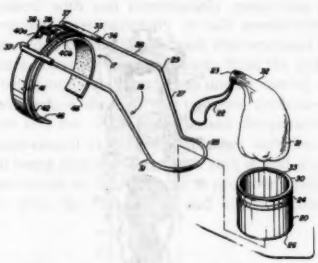
4,502,417

DOG DRIP UNIT

Curlee Jenkins, 5612 S. Hoyne Ave., Chicago, Ill. 60626

Continuation-in-part of Ser. No. 336,682, Jul. 25, 1983. This application Jun. 8, 1984, Ser. No. 618,568
Int. Cl.³ A01K *23/00*
U.S. Cl. 119—95 **5 Claims**

1. A pet droppings collection device comprising:
- a friction clamp adapted to encircle a portion of the girth of a pet along the rib-to-loin area, and having a pair of bushings horizontally mounted on the clamp adapted to slide mounting of a yoke, and having a centrally located hinge lock to secure the clamp about the pet;
- a yoke mounted on the clamp and having a pair of substantially parallel arms extending horizontally and rearwardly from the clamp, said yoke having a pair of descending arms attached to said parallel arms adapted to pass over and be supported by the rear flanks of a pet, and terminating in a perianal loop joining said descending arms below the type of a dog;
- a rigid receptacle mounted within the loop having a circumferential mating member with said loop to removably hold the receptacle therewithin;



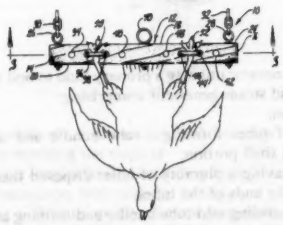
- a flexible collection pouch with draw string mouth positioned within the receptacle and having a mouth capable of being spread open over the receptacle finish in the receiving position and being closable by said draw string for removal and disposal.

4,502,418

ANIMAL AND BIRD RESTRAINER

William S. Runyan, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Nov. 8, 1982, Ser. No. 439,767
Int. Cl.³ A01K *37/00*; A22B *1/00*
U.S. Cl. 119—97 R **9 Claims**



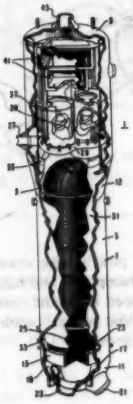
1. An animal and bird restrainer, comprising,
- an elongated block having top, bottom and opposite end portions,
- means for holding said block in a substantially horizontal position,
- a plurality of horizontally disposed and spaced-apart holes in said block adjacent the ends thereof,
- a first U-shaped bolt member removably, selectively horizontally and adjustably mounted in the holes at one end of said block,
- a second U-shaped bolt member removably, selectively horizontally and adjustably mounted in the holes at the other end of said block,
- each of said bolt members having a pair of horizontally disposed legs which extend through said holes,
- and means on the ends of said legs to adjustably support said U-bolt members with respect to said block.

4,502,419

DISCHARGE TUBE FOR INHIBITING STRATIFICATION IN FEEDWATER HEADERS OF A STEAM GENERATOR

Allen C. Smith, Jr., Bethel Park, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 14, 1984, Ser. No. 609,679
Int. Cl.³ F22B 1/06; F22D 1/28
U.S. Cl. 122—32 12 Claims



1. A steam generator utilizing a primary fluid to boil water to make steam, said steam generator comprising:

a shell portion;

a plurality of tubes forming a tube bundle and disposed within said shell portion;

a tubesheet having a plurality of holes disposed therein for receiving the ends of the tubes;

a wrapper encircling said tube bundle and forming an annular space adjacent said shell;

a feedwater header disposed within said shell so as to have an upper and lower portion;

an inlet feedwater nozzle for supplying feedwater to said feedwater header;

a first plurality of discharge nozzles disposed in fluid communication with the upper portion of said feedwater header and having a discharge level above said feedwater header;

a second plurality of discharge nozzles in fluid communication with the lower portion of the feedwater header and having a discharge level which is above the upper portion of the feedwater header, but lower than the discharge level of the first plurality of discharge nozzles;

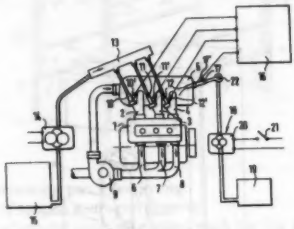
whereby during periods of low feedwater flow cold feedwater is removed from the bottom of the feedwater header to stimulate mixing of feedwater with the feedwater in the head and an even temperature throughout the header.

4,502,420

RECIPROCATING PISTON COMBUSTION ENGINE WITH WATER INJECTION

Hans Mezger, Freiberg, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 29, 1983, Ser. No. 536,974
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1982, 3236233
Int. Cl.³ F02M 25/02
U.S. Cl. 123—25 C 16 Claims



1. In a reciprocating piston combustion engine for a motor vehicle having a plurality of cylinders, a fuel injection system having N fuel injection valves and control means for controlling the operation of the fuel injection valves, and at least one water injection valve for the engine, the improvement comprising:

said water injection valve having the same construction as said fuel injection valves; and

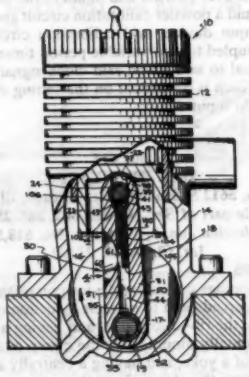
said control means having at least (N+1) similar control outputs for controlling the operation of said fuel and water injection valves in a substantially similar manner over a range of engine operating conditions.

4,502,421

ROD LUBRICATION MEANS FOR TWO-CYCLE INTERNAL COMBUSTION ENGINES

John C. Perry, 3170 Falcon Dr., Carlsbad, Calif. 92008

Filed Apr. 10, 1984, Ser. No. 598,901
Int. Cl.³ F01P 1/04
U.S. Cl. 123—41.37 13 Claims



1. A means to lubricate rod bearing surfaces for a two-cycle internal combustion engine comprising:

an engine housing forming a crankcase chamber and bearing surfaces for a crankshaft, said crankshaft forming one or

more crankpins, said crankpin forming bearing surfaces thereon,

one or more rods forming, at a first end, a crankpin bearing surface, said crankpin bearing surface mates to said crankshaft crankpin, and, at a second end of said rod, a wrist pin bearing surface, said wrist pin bearing surface mates to a wrist pin in a piston, said piston being contained within a cylinder,

lubrication means contained within a longitudinally extending bore formed in said one or more rods, said bore communicates with said crankpin bearing surface at said first rod end and said wrist pin bearing surface at said second rod end, a passage means is formed in said rod, said passage means communicates between said crankcase chamber and said longitudinally extending bore formed within said one or more rods, and

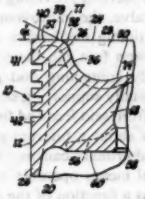
a cylindrical valve means is contained within said longitudinally extending bore having first and second ends, a cross-sectional circumference of said cylindrical valve means is about one-third the cross-sectional circumference of said bore formed in said one or more rods, said first end of said valve means forming a pivot means adjacent said wrist pin at said second end of said one or more rods, said second end of said valve means extends beyond said passage means formed in said rod, said pivot means being adapted to allow said second end of said cylindrical valve means to swing from side to side within said longitudinally extending bore in said rod, where said two-cycle engine rotates clockwise when viewed from the rear of the engine, said second end of the cylindrical valve means swings within said longitudinally extending bore toward the passage means, said passage means being positioned on the left side of said rod, when the rod rotates with said crankpin from about a nine o'clock position to about a three o'clock position, said passage means is closed off by an exterior wall of said valve means near said second end of said valve, thereby preventing lubricant entrapped within said longitudinal bore from escaping said bore, as said rod rotates with said crankpin from about the three o'clock position to about the nine o'clock position, said cylindrical valve means swings away from said passage means allowing a mixture of fuel and oil entrapped within said crankcase chamber to enter said longitudinally extending bore through said passage means, to lubricate said crankpin and wrist pin bearings and to cool said rod as said one or more rods reciprocates and rotates around said crankpin during operation of said two-cycle engine.

4,502,422

HIGH OUTPUT OIL COOLED FLOATING PISTON

David E. Brann, Lemont, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 27, 1982, Ser. No. 453,748
Int. Cl.³ F01P 3/06
U.S. Cl. 123—41.35 **5 Claims**



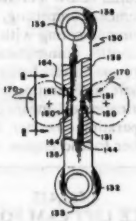
1. An oil cooled piston for an internal combustion engine, said piston having a hollow body with a closed head end, said end being centrally recessed to form a thin-walled combustion chamber bowl outwardly embraced by a hollow rim including a thin-walled radial portion having a planar outer surface comprising an annular squish land, heat conducting means within said hollow body and connecting with said bowl and rim, said head end and said heat conducting means being adapted to be contacted by cooling oil supplied to the hollow body interior to cool said head end by removing heat from the thin-walled areas and the connecting heat conducting means, said hollow rim including an annular curved wall of relatively constant thickness and curvature, said curved wall being smoothly joined with and continuously connecting an upwardly sweeping outer periphery of said combustion bowl with an inner edge of said squish land, characterized by said wall curvature convexly extending away from the axis of the piston and being moderate so as not to unduly restrict cooling of the outer surface through the opposite coolant-exposed inner surface area but of less than desired sharpness for promoting squish-caused combustion chamber turbulence, said curved wall being joined to the squish land at said inner edge by an angular break in the curvature to promote separation of squish flow from the rim surface and improve combustion turbulence.

4,502,423

LUBRICATION MEANS FOR A TWO-CYCLE INTERNAL COMBUSTION ENGINE

John C. Perry, 3170 Falcon Dr., Carlsbad, Calif. 92008

Continuation-in-part of Ser. No. 541,952, Oct. 10, 1983, Pat. No. 4,466,387. This application Nov. 25, 1983, Ser. No. 555,194
Int. Cl.³ F01P 1/04, 3/06
U.S. Cl. 123—41.38 **14 Claims**



14. A method of lubricating rod bearings for two-cycle engines comprising the steps of:

forming a longitudinally extending bore in a rod, said bore communicates with said rod bearings,

forming a first relatively narrow longitudinally extending slot, in said rod between said bore in rod and a crankcase chamber of said engine, said slot communicating therebetween,

forming a second longitudinally extending slot in said rod one hundred and eighty degrees from said first slot, said second slot extends partway through a wall formed by said rod, and

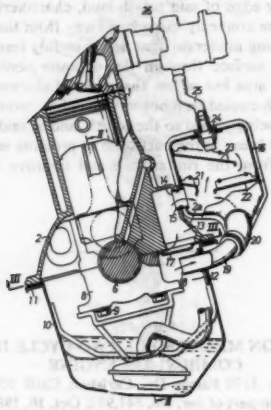
passing a source of lubricant entrained within said chamber into said bore in said rod through said first slot in said rod during operation of said engine, said lubricant forming a column of lubricating liquid within the bore formed in said rod, said column of liquid is alternately forced into one of said rod bearings under high pressure through inertia forces exerted on said column of liquid when said rod reaches its reciprocal limit and reverses direction, the opposite bearing being lubricated similarly by said column of liquid as said rod again reaches its reciprocal limit and reverses direction.

4,502,424

BLOW-BY GAS RECOVERING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Hisashi Katoh, Tokyo; Hiroshi Shinagawa, and Keiji Miura, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1983, Ser. No. 545,904
Claims priority, application Japan, Nov. 24, 1982, 57-205826
Int. Cl.[3] F02F 9/02
U.S. Cl. 123—41.86 4 Claims



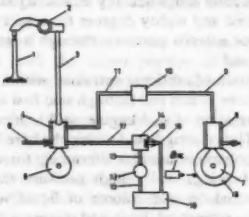
1. A blow-by gas recovering system for an internal combustion engine, the engine having a crankshaft and having a pan for lubricating oil secured below a crankcase to define a crank chamber, the improvement comprising, in combination: a first blow-by gas outlet communicating with said crank chamber, a second blow-by gas outlet communicating with said crank chamber, said blow-by gas outlets being spaced longitudinally of the engine crankshaft, a separating chamber for separating blow-by gas from lubricating oil, means connecting each blow-by passage to said separating chamber, and means connecting said separating chamber to said engine intake system.

4,502,425

VARIABLE LIFT CAM FOLLOWER

Donald C. Wride, Valley View, Australia, assignor to Marlene A. Wride, Valley View, Australia

PCT No. PCT/AU82/00003, § 371 Date Sep. 17, 1982, § 102(e) Date Sep. 17, 1982, PCT Pub. No. WO82/02574, PCT Pub. Date Aug. 5, 1982
PCT Filed Jan. 20, 1982, Ser. No. 420,242
Int. Cl.[3] F01L 1/24; F02D 13/02
U.S. Cl. 123—90.12 4 Claims



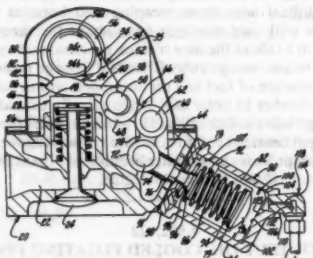
1. A mechanism for varying the lift and duration of lift of the valves of an internal combustion engine having a primary cam shaft operating at least one primary hydraulic cam follower, said primary hydraulic cam follower having a body, a primary cam follower piston actuated directly by said primary cam shaft, a push rod piston spaced from the said primary cam follower piston to form an oil chamber therebetween, spring means acting between said primary hydraulic cam follower piston and said push rod piston, means for feeding hydraulic fluid to said oil chamber through a one way valve, a secondary cam shaft driven by said engine, a secondary cam follower operating in a housing rotatable about said secondary cam shaft, said primary cam follower having a hydraulic bleed from said oil chamber, means connecting said bleed to said secondary cam follower to supply hydraulic fluid thereto, a secondary bleed from said secondary cam follower whereby rotation of the housing of the secondary cam follower about said secondary cam shaft controls the bleed from the primary cam follower to vary the lift and duration of lift of the push rod piston.

4,502,426

VARIABLE VALVE LIFT AND TIMING MECHANISM

James H. Skelley, 1574 Cole, Birmingham, Mich. 48008

Continuation of Ser. No. 378,892, May 17, 1982, abandoned.
This application May 1, 1984, Ser. No. 605,876
Int. Cl.[3] F01L 1/34
U.S. Cl. 123—90.15 18 Claims



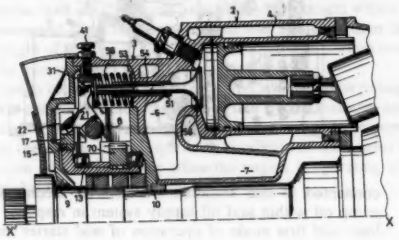
1. In an internal combustion engine having at least a cylinder and a piston defining a variable volume combustion chamber, a poppet-type valve for said combustion chamber operated by a valve spring and associated valve lifter, a cam shaft and fixed profile primary cam thereon providing a fixed timing mode of operation for said valve, the improvement comprising a variable valve lift and timing mechanism including a secondary cam having a head at a free end thereof operably interposed between and slidably contacting said primary cam and said lifter, means for pivotally supporting said secondary cam at an end thereof remote from said free end for pivotal movement of said secondary cam about a fulcrum point spaced from the contact points of said primary cam and lifter with said secondary cam and control means operable to vary the position of said fulcrum point as a function of the speed of the engine to thereby vary the amount of lift and the timing of the opening and closing of said valve, while maintaining the period between said opening and closing generally constant, said secondary cam head being non-circular and having first and second convexly curved surfaces slidably bearing against said primary cam and said lifter respectively.

4,502,427

ROCKER ARM FOR AXIAL ENGINE

Maurice Brille, 27, rue Parmentier, 9200 Nanterre, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt and Maurice Brille, Nanterre, both of, France

Filed Mar. 4, 1983, Ser. No. 472,208
Claims priority, application France, Mar. 4, 1982, 82 03576
Int. Cl.³ F01L 1/18
U.S. Cl. 123—90.41 10 Claims



1. In an axial internal combustion engine having a casing containing at least one valve movable in a first direction, a return spring for each said valve, a cam actuated push rod of each said valve and a rocker arm connecting each said valve with one said push rod, a timing device comprising:

a rocker arm carrier in said casing for each said rocker arm, each said rocker arm being mounted in one said rocker arm carrier, each said rocker arm carrier being movable in a direction perpendicular to said first direction;

a fixed annular piece in said casing, said annular piece having two parallel cylindrical seatings for each said valve, said cylindrical seatings including longitudinal axes which are perpendicular to the axis of said axial engine, said annular piece further having a bore connecting said two seatings, wherein said rocker arm carrier and said push rod are each positioned in one of said seatings, and said rocker arm is positioned in said bore; and

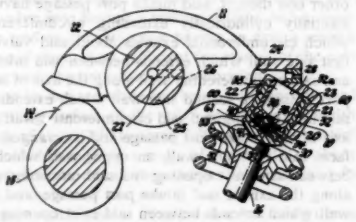
regulating means engageable with said rocker arm carrier for adjustably maintaining the position of said rocker arm carrier in said first direction, an adjusting portion of said regulating means extending outside of said casing.

4,502,428

LASH ADJUSTER WITH FOLLOWER BODY RETAINER

Michael S. Paar, Battle Creek, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 22, 1984, Ser. No. 582,378
Int. Cl.³ F01L 1/24
U.S. Cl. 123—90.46 2 Claims



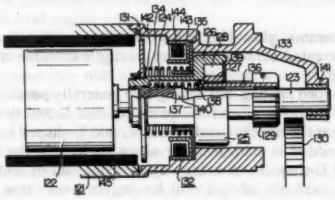
1. An integral valve actuator member and hydraulic lash adjuster assembly including a valve actuator member having a stepped blind socket bore extending from one surface thereof so as to define an internal cylindrical adjuster guide wall next adjacent to said one surface, an enlarged wall defining a reservoir adapted to be supplied with hydraulic fluid under pressure and, an abutment shoulder interconnecting said walls; a hydraulic lash adjuster having a cylindrical body slidably received in said adjuster guide wall with one end thereof loosely received in said reservoir, said body having an annular groove on its outer peripheral surface next adjacent to said one end that is defined by spaced apart sidewalls and an interconnecting lower arcuate base wall, one of said sidewalls next adjacent to said one end defining a transverse shoulder that extends at substantially right angles to the longitudinal axis of said body and the other one of said sidewalls forming an acute angle with said transverse shoulder; and, an annular, normally flat, ring-like retainer of deformable compliant material operatively positioned in said annular groove in said body, said retainer having an outside diameter greater than the internal diameter of said adjuster guide wall and an inside diameter complementary to the outside diameter of said base wall, said retainer being adapted to be temporarily deformed into a frustoconical configuration during insertion of said body of said hydraulic lash adjuster and said retainer into said adjuster guide wall and to then return to its normal flat configuration whereby it can then function so that opposite sides thereof will abut against said transverse shoulder and said abutment shoulder.

4,502,429

INERTIA DRIVE TYPE STARTER FOR INTERNAL COMBUSTION ENGINE

Kohei Ebihara, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 7, 1982, Ser. No. 433,262
Claims priority, application Japan, Oct. 9, 1981, 56-160215
Int. Cl.³ F02N 17/00
U.S. Cl. 123—179 J 6 Claims



1. A starter for an internal combustion engine, comprising:

a DC motor;

a driving shaft rotated by said DC motor;

an overrunning clutch provided on said driving shaft and including an axially movable driving member which is rotated and axially moved as said driving shaft is rotated and a driven member which is rotated and axially moved according to the rotation and axial movement of said driving member;

a ring gear fixedly mounted on a rotary shaft of said internal combustion engine,

a pinion gear rotatably mounted on said driving shaft and fixedly connected to said driven member so that said pinion gear is axially moved as said driven member is axially moved, to engage with said ring gear;

a stationary member fixedly mounted on a frame of said DC motor and supporting said driving shaft;

an electromagnet fixedly mounted on said stationary member and having a coil applied with a voltage which is in proportion to an armature current of said DC motor, the armature current of said DC motor varying with the loading of said DC motor;

a holder member mounted on said clutch in such a manner so that said holder member is circumferentially rotatably relative to said clutch while limited in axial movement and said holder member is arranged opposite to said electromagnet with a predetermined spacing therebetween so that said holder member is attracted by said electromagnet

under attractive force thereof when said pinion gear and said ring gear are in the engaged state; and

a spring member disposed between said holder member and a seat member provided on said stationary member for biasing said holder member in a manner so that said holder member is axially moved together with said driving member and said driven member to disengage said pinion gear from said ring gear when the attractive force of said electromagnet is decreased below a predetermined value in accordance with a decrease in the load of said DC motor.

4,502,430

CERAMIC HEATER

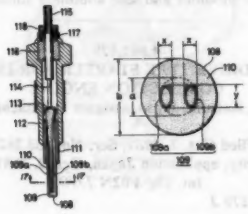
Shinichi Yokoi, and Tsuneo Ito, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Nov. 7, 1983, Ser. No. 549,327

Claims priority, application Japan, Nov. 8, 1982, 57-194767; Nov. 8, 1982, 57-194768

Int. Cl.³ F02B *9/08*; F02P *19/02*

U.S. Cl. 123—145 A **2 Claims**



1. A ceramic glow plug comprising:

an elongated ceramic insulator having a circular cross section;

a U-shaped heating coil having two generally parallel helical coil portions, a bend at one end of said U and two terminals at the opposite end of said U, said U-shaped coil being imbedded in said insulator along its length, the bend in said U-shaped coil being adjacent one end of said insulator, each leg of said coil having an oval cross section having short and long diameters, planes passing through the long diameter of each of said ovals being substantially parallel to one another and planes passing through the short diameter of each of said ovals being substantially co-planar, the diameter of a cylinder defined by the outer surface of said coil portions and the outer diameter of said insulator having a ratio of 35:100 to 70:100.

4,502,431

PRE-COMBUSTION ENGINE LUBRICATION SYSTEM

John F. Lulich, R.D. #3, Box 55, Blairsville, Pa. 15717

Filed Mar. 3, 1983, Ser. No. 471,669

Int. Cl.³ F02N *11/08*

U.S. Cl. 123—179 A **12 Claims**

1. In an internal combustion engine having

a plurality of movable parts which require lubrication during relative movement to reduce wear;

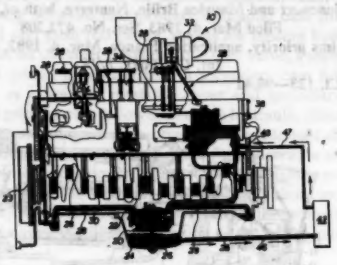
an electromechanical engine starter mechanism for initiating movement within said engine and having an armature shaft; and

an oil supply system having a main oil pump which circulates oil to said movable parts in response to movement within said engine;

the improvement comprising:

means for activating said starter mechanism in a first mode of operation in which movement is not initiated within said engine and in a second mode of operation in which movement is initiated within said engine to effect combustion; and

a supplemental oil pump communicating with said oil supply system and including a rotatable drive shaft operatively



connected to said armature shaft starter mechanism to pump oil within said oil supply system in response to at least said first mode of operation of said starter mechanism.

4,502,432

HELICALLY SHAPED INTAKE PORT OF AN INTERNAL-COMBUSTION ENGINE

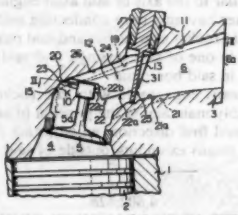
Takeshi Okumura; Kiyoshi Nakanishi, both of Susono, and Tokuta Inoue, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 18, 1983, Ser. No. 495,596

Claims priority, application Japan, Aug. 31, 1982, 57-150095

Int. Cl.³ F02F *1/42*

U.S. Cl. 123—188 M **25 Claims**



1. An intake device of an internal-combustion engine comprising:

an intake valve having a valve stem;

an axially extending intake port passage having an inlet opening at one end thereof and an outlet opening at the other end thereof, said intake port passage having a substantially cylindrically extending circumferential wall which circumferential extends about said valve stem, a first side wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage, a second side wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage and is arranged so that it faces said first side wall, an upper wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage, and a bottom wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage;

a separating wall projecting downwardly from said upper wall and spaced from said bottom wall, said separating wall extending along the axis of said intake port passage and being spaced from said circumferential wall so as to define a helical portion having a helix-terminating portion

between said separating wall and said circumferential wall, said separating wall having a first side wall spaced from the first side wall of said intake port passage so as to define therebetween an inlet passage portion tangentially connected to said helical portion, said separating wall having a second side wall spaced from the second side wall of said intake port passage so as to define therebetween a bypass passage which interconnects said inlet passage portion and said helix-terminating portion, the upper wall of said bypass passage having a height which is measured from said bottom wall and is higher than the height of the upper wall of said inlet passage portion over the entire length of said bypass passage;

normally closed valve means arranged in said bypass passage for controlling the flow area of said bypass passage; and

actuating means for actuating said valve means in response to the change in the operating condition of the engine to open said valve means when the engine is operating at a high speed under a heavy load.

4,502,433

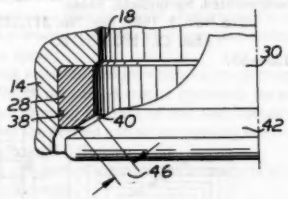
VALVE CONSTRUCTION FOR MULTI-FUEL ENGINE

Theodore Becker, Jr., Chillicothe; Sam R. Congram, Peoria, and Carl L. McClung, Metamora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 055,583, Jul. 9, 1979, abandoned, which is a continuation-in-part of Ser. No. 916,972, Jun. 19, 1978, abandoned, which is a continuation-in-part of Ser. No. 822,844, Aug. 8, 1977, abandoned. This application Nov. 27, 1981, Ser. No. 325,176

Int. Cl.³ F01L *3/22*

U.S. Cl. 123—188 S **3 Claims**



1. In an engine for efficiently burning leaded gasoline, unleaded gasoline and liquid propane fuels, said engine having a head, a valve seat having a seating surface and a mean seat diameter, and an exhaust valve having an axis, a seating face and being of dimensions sufficient for seating of the valve on the valve seat, the improvement comprising:

an insert having a surface and being positioned in the head;

said seating surface of the valve seat having a width in a range of about 2.30 to about 2.90 millimeters and defining an included angle in a range of about 110° to about 130° relative to the axis of the exhaust valve and being formed by the surface of said insert;

said mean seat diameter of said valve seat being dimensionally greater than said width of said seating surface by a factor of about 14;

a valve spring urging said exhaust valve against said valve seat at a force of about 200 Newtons and not less than 200 Newtons; and

a valve rotator for rotating said exhaust valve in response to axial movement of said exhaust valve.

4,502,434

INTERNAL COMBUSTION ENGINE

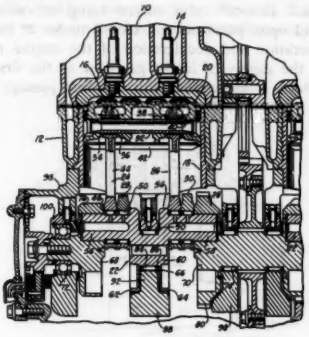
Shoichiro Irimajiri, Saitama, and Takeo Fukui, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 188,477, Sep. 18, 1980, Pat. No. 4,383,508, which is a continuation-in-part of Ser. No. 22,801, Mar. 22, 1979, abandoned. This application Sep. 30, 1982, Ser. No. 430,847

Claims priority, application Japan, Mar. 30, 1978, 53-40106

Int. Cl.³ F02F *3/28*

U.S. Cl. 123—193 P **1 Claim**



1. An internal combustion engine conprising

an oval engine cylinder;

an oval piston mounted to reciprocate in sliding contact with said oval engine cylinder;

a crankshaft extending parallel to the major dimension of said piston having an axis of rotation;

two connecting rods extending between said piston and said crankshaft;

bearings rotatably supporting said crankshaft relative to said oval engine cylinder, a first one of said bearings being between said two connecting rods;

a crankcase fixed relative to said oval engine cylinder;

a journal box rotatably supporting said first bearing, said journal box including a first section, a second section, first fasteners and second fasteners, said two sections each defining one half of the journal cavity in which said first bearing is positioned, said first section being fixed by said first fasteners to said second section and said second section being fixed by said second fasteners to said crankcase, said second section being on the other side of said crankshaft from said oval engine cylinder; and

wherein said first bearing is a roller bearing including rollers and a roller cage and coaxially aligned with said axis of rotation, said cage being diametrically split.

4,502,435

INTAKE SYSTEM FOR MULTIPLE CYLINDER INTERNAL COMBUSTION ENGINE

Tomoo Tadokoro, and Toshimichi Akagi, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Continuation of Ser. No. 289,696, Aug. 3, 1981, abandoned, which is a continuation of Ser. No. 22,310, Mar. 20, 1979, abandoned. This application Sep. 6, 1983, Ser. No. 529,669

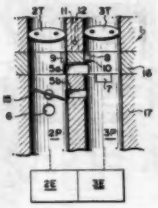
Claims priority, application Japan, Mar. 24, 1978, 53-34653

Int. Cl.³ F02D *17/02*

U.S. Cl. 123—198 F **4 Claims**

1. A multiple-cylinder internal combustion engine comprising at least first and second cylinder means; first and second passage means which are separated from each other and communicate, respectively, with the first and second cylinder means; throttle valve means provided in each of the first and

second passage means; first and second light load fuel passage means branched from common fuel passage means and communicating through opening means respectively to said first and second passage means downstream of said throttle valve means; first communicating means immediately downstream of the opening means; means through which said first and second light load fuel passage means communicate with the first and second passage means for establishing communication between the first and second passage means to thereby moderate pulsations of intake gas flow; shut-off valve means provided in the first passage means downstream of said first communicating means, said shut-off valve means being movable between closed and open positions and closed under at least one of idling operation and deceleration of the engine to thereby interrupt the supply of intake gas flow to the first cylinder means which is associated with the first passage means in



which said shut-off valve means is provided and to lead the intake gas in the first passage means to the second passage means through the first communicating means, said shut-off valve means being of a butterfly valve type which is inclined in the closed position, relative to said first passage means, to have an upstream edge portion and a downstream edge portion; second communicating means provided between the first communicating means and said shut-off valve means and located in the vicinity of the downstream edge portion of the shut-off valve means in the closed position for providing communication between the first and second passage means to direct liquid fuel that is collected thereon toward said second communicating means and thereby prevent accumulation of fuel at the shut-off valve means, said second communicating means having a cross-sectional area smaller than that of the first communicating means.

4,502,436

CARBURETOR FOR INTERNAL COMBUSTION ENGINES WITH ELECTROMAGNETIC CONTROLLED DEVICES FOR POSITIONING THE THROTTLE IN TWO POSITIONS WITH SMALL OPENINGS

Silverio Bonfiglioli, Zola Predosa, and Giovanni Gardellini, Casalecchio di Reno, both of Italy, assignors to Weber S.p.A., Turin, Italy

Filed Jun. 28, 1982, Ser. No. 392,677
Claims priority, application Italy, Jul. 10, 1981, 3477 A/81
Int. Cl.³ F02D *9/08, 11/10*
U.S. Cl. 123—339 **1 Claim**

1. A carburetor for an internal combustion engine comprising:

a main barrel divided by a throttle valve into a first part which communicates with an air filter and a second part which communicates with an intake manifold;

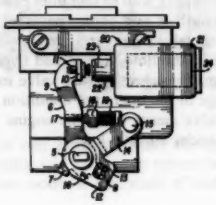
an electromagnetic controlled device having a movable operating rod for positioning said throttle valve in two positions each of which maintains a respective small opening between said first and second parts of said main barrel;

a shaft for turning said throttle valve;

an idle system which opens into said barrel and including at least one mixture orifice which, when the throttle valve is in a first of said two positions, communicates with said first part and, when the throttle valve is in a second of said two positions, communicates with said second part;

first and second control levers for operating said throttle valve and on which, respectively, a return spring and an accelerator pedal act;

a first and second stopping members for defining, resspectively, said first and said second positions of the said throttle valve, said second stopping member being integral with the said operating rod, said stopping members and said return spring operating on said first lever which is



fixedly connected on said shaft, said accelerator pedal operating on said second lever which is mounted to rotate on said shaft; said first and second levers being connected to each other by means of connecting members permitting a limited rotation of said first lever with respect to said second lever; one of said connecting members comprising a lug of said first lever which is inserted in a slot provided in said second lever; and,

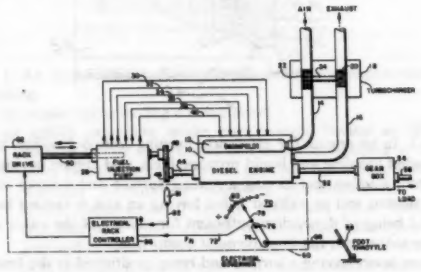
means for supporting a structure which contains said electro-magnetic device and an electrical control circuit responsive to engine RPM for operating said device.

4,502,437

ELECTRICAL FUEL CONTROL SYSTEM AND METHOD FOR DIESEL ENGINES

James R. Voss, Wilbraham, Mass., assignor to AMBAC Industries, Incorporated, Springfield, Mass.

Filed Nov. 2, 1981, Ser. No. 317,253
Int. Cl.³ F02D *31/00*
U.S. Cl. 123—357 **14 Claims**



1. Smoke control apparatus for a turbocharged engine, comprising:

means for producing one or more signals representative of one or more definitive parameters of the kinetic energy of the engine exhaust flow which drives the turbocharger of said engine, said one or more signals being independent of any measured value of intake air pressure of the engine;

means for storing information which is a function of the response of said turbocharger to changes in said parameters;

means for accessing said information in response to said one or more signals and independently of any measured value

of intake air pressure of the engine, to produce one or more other signals representative of substantially the maximum rate at which the delivery of fuel to said engine can be increased from its existing level without producing more than a predetermined level of smoke from said exhaust; and

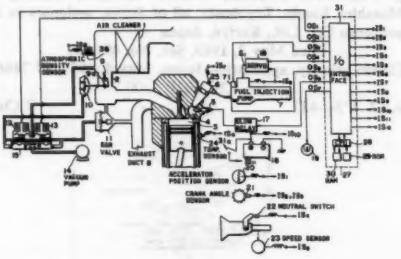
means for limiting said rate of increase of fuel delivery in response to said one or more other signals to prevent said rate of increase in fuel delivery from rising above said substantially maximum rate.

4,502,438

ELECTRONIC FUEL INJECTION CONTROL METHOD AND APPARATUS FOR A FUEL INJECTION TYPE INTERNAL COMBUSTION ENGINE

Seishi Yasuhara, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Mar. 29, 1982, Ser. No. 363,152
Claims priority, application Japan, Mar. 30, 1981, 56-45649
Int. Cl.³ F02D *5/02*
U.S. Cl. 123—357 **20 Claims**



1. A fuel injection quantity control method for an internal combustion engine with a fuel injection valve, and an actuator controlling the quantity of fuel supplied to the fuel injection valve in response to a control signal comprising the steps of:

(a) sensing a plurality of engine operating parameters including engine speed;

(b) calculating a desired fuel injection valve opening interval on the basis of the sensed engine operating parameters;

(c) sensing an opening interval of said fuel injection valve;

(d) comparing the desired and actual opening intervals of the valve to derive a difference; and

(e) adjusting the control signal to the actuator in accordance with the difference,

whereby the actuator is controlled so as to adjust the quantity of injected fuel, corresponding on the basis of the sensed engine parameters to the injection valve opening interval, to more nearly equal a desired fuel injection quantity corresponding to the desired fuel injection valve opening interval.

4,502,439

CONTROLLING DEVICE FOR QUANTITY OF FUEL INJECTION IN DIESEL ENGINE

Masaomi Nagase, Toyota, and Hideo Miyagi, Okazaki, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Mar. 3, 1983, Ser. No. 471,667
Claims priority, application Japan, Apr. 2, 1982, 57-54925
Int. Cl.³ F02D *31/00*
U.S. Cl. 123—357 **12 Claims**

1. A controlling device for quantity of fuel injection in a diesel engine having a fuel injection pump including:

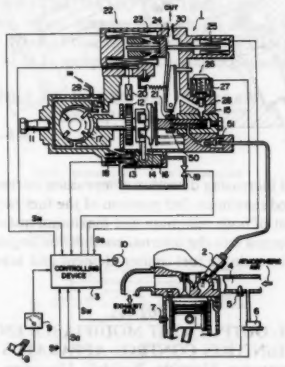
a timer means for controlling an actual fuel injection timing in accordance with a position of said timer, said position being changed on the basis of an oil pressure applied to said timer through an oil pressure circuit;

a timer position sensor for detecting said position of said timer to produce a position signal indicative of said position of said timer; and

a means for injecting fuel in accordance with a drive signal indicative of a final quantity of fuel injection; wherein said controlling device comprises:

a means for calculating a quantity of fuel injection and a maximum injection quantity in accordance with an engine operating condition;

a means for deciding any trouble or accident of said timer position sensor on the basis of said position signal;



a means for deciding any trouble or accident of said oil pressure circuit based on such a fact that a deviation of an injection timing calculated on the basis of operating conditions in the respective parts of said Diesel engine detected by sensors from said actual injection timing determined on the basis of said position signal is more than a set point which has previously been set;

a means for subtracting by a predetermined quantity from said maximum injection quantity at the time of deciding any of said troubles or accidents; and

a means for selecting less quantity out of the calculated quantity of fuel injection and the maximum injection quantity and producing said drive signal in accordance with the quantity thus selected.

4,502,440

FUEL INJECTOR GOVERNOR

Matthew H. Fronk, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 30, 1984, Ser. No. 605,067
Int. Cl.³ F02D *31/00*
U.S. Cl. 123—367 **2 Claims**

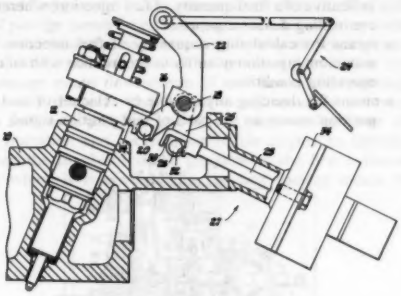
1. A controller for an internal combustion engine fuel injector having a fuel rack moveable in fuel increasing and decreasing directions for controlling the quantity of fuel injected into the engine by the fuel injector, the controller comprising:

a governor element secured for movement with the fuel rack in the fuel increasing and decreasing directions;

a fuel limiter element having a first fuel limit surface engaged by the governor element when moved in the fuel increasing direction and a second fuel limit surface engaged by the governor element when moved in the fuel decreasing direction, the movement of the fuel rack being restricted to the movement of the governor element between the first and second fuel limit surfaces; and

an actuator responsive (A) to minimum fuel limit commands to move the fuel limiter element to position the second fuel limit surface to limit the movement of the governor

element in the fuel decreasing direction at a position corresponding to a desired minimum fuel position of the fuel rack and (B) to maximum fuel limit commands to move the fuel limiter element to position the first fuel limit surface to limit the movement of the governor element in



the fuel increasing direction at a position corresponding to a desired maximum fuel position of the fuel rack, whereby the limit of both minimum and maximum quantities of the fuel injected into the internal combustion engine are established by a single fuel limiter element and actuator.

4,502,441

INPUT/OUTPUT UNIT MODIFIABLE ENGINE IGNITION CONTROL APPARATUS

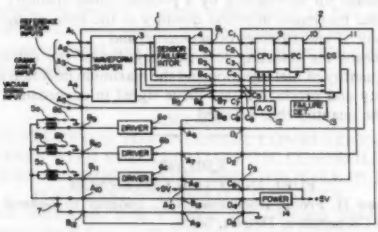
Hiroomi Katayama, Machida; Yoshiaki Hirosawa, Shiki, and Masahiko Fujii, Yokohama, all of Japan, assignors to New Nippon Electric Co., Ltd., Osaka and Honda Giken Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Filed Oct. 12, 1982, Ser. No. 433,912

Claims priority, application Japan, Oct. 12, 1981, 56-160913

Int. Cl.³ F02B *5/00*

U.S. Cl. 123—416 **8 Claims**



1. An engine ignition control apparatus operatively connectable to receive reference position signals, a crank angle signal, a vacuum signal and to ignition coils, comprising:

input-output means, operatively connectable to the ignition coils and to receive the reference position signals, the crank angle signal and the vacuum signal, for shaping the reference position signal and the crank angle signal, for interpolating absent reference position signals and for outputting ignition coil signals, said input-output means comprising:

N drivers, operatively connected between the ignition coils and said control means, for driving the ignition coils in dependence upon the ignition signals, where N is an integer equal to the number of engine cylinders divided by 2 and rounded upward;

a waveform shape circuit, operatively connectable to receive the reference position signals and the crank angle signal, for shaping the reference position signals and the crank angle signals; and

a sensor failure interpolator, operatively connected to said waveform shape circuit, for generating replacement reference position signals when one or more of the reference position signals are absent; and

control means, operatively connected to said input-output means, for generating an ignition signal in dependence upon the reference position signals, the crank angle signal and the vacuum signal, said control means being capable of generating ignition signals for an engine having 1 to 6 cylinders, said input-output means generating the ignition coil signals in dependence upon the ignition signals.

4,502,442

OPTIMUM IGNITION AND A/F CONTROL FOR INTERNAL-COMBUSTION ENGINE

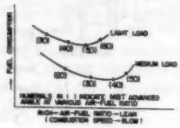
Eiji Takakuwa, Okazaki; Kouichi Shimizu, Handa, and Masahiro Kondo, Toyohashi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

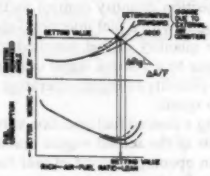
Filed May 3, 1983, Ser. No. 491,231

Claims priority, application Japan, May 4, 1982, 57-74860

Int. Cl.³ F02P *5/00*

U.S. Cl. 123—417 **7 Claims**





1. A method of controlling an internal-combustion engine for a vehicle comprising means for controlling supplied fuel, means for correcting supplied-air quantity, means for variably controlling ignition timing, stability discrimination means for discriminating a stable running state of said engine, said method comprising the steps of:

previously determining an ignition timing unit-correction angle value and an air quantity unit-correction value corresponding to various running conditions of said engine;

cyclically correcting the ignition timing and the supplied-air quantity each by the respective unit-correction value in response to current running conditions of said engine and an output signal indicating a stable running state produced from said stability discrimination means;

checking for an engine-output change per every correction of the ignition timing and the supplied-air quantity to determine the respective direction of the next cycle correction;

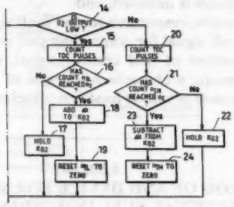
ending the cyclical correction with the check of the engine-output change in a predetermined range; and

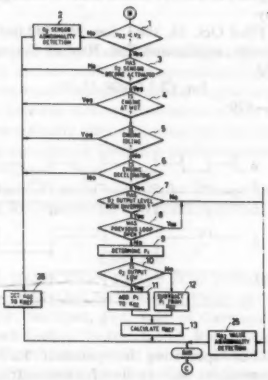
starting the cyclical correction for new running conditions of said engine after a predetermined interval after said ending step.

4,502,443
AIR/FUEL RATIO CONTROL METHOD HAVING FAIL-SAFE FUNCTION FOR ABNORMALITIES IN OXYGEN CONCENTRATION DETECTING MEANS FOR INTERNAL COMBUSTION ENGINES

Shumpei Hasegawa, Niiza, and Akihiro Yamato, Shiki, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 27, 1983, Ser. No. 498,951
Claims priority, application Japan, May 28, 1982, 57-90659
Int. Cl.³ F02M 7/00
U.S. Cl. 123—440 **5 Claims**





1. In a method for controlling the air/fuel ratio of an air/fuel mixture being supplied to an internal combustion engine having means for detecting oxygen concentration in exhaust gases emitted from the engine, to desired values, by correcting a basic fuel quantity dependent upon values of predetermined parameters indicative of operating conditions of the engine, by the use of at least one coefficient each time each pulse of a predetermined control signal is generated, wherein a determination is effected whether or not the engine is operating in a predetermined feedback control region wherein the air/fuel ratio is controlled in response to the output from said oxygen concentration detecting means, and when it is determined that the engine is operating in said predetermined feedback control region a first coefficient is applied as one of said at least one coefficient, said first coefficient having a value variable with a change in the output from said oxygen concentration detecting means, the improvement comprising the steps of:

(1) calculating a mean value of values of said first coefficient applied during operation of the engine in said predetermined feedback control region;

(2) determining whether the engine is operating in any of a plurality of predetermined particular operating regions other than said predetermined feedback control region;

(3) applying as one of said at least one coefficient a second coefficient being said mean value of said first coefficient in place of said first coefficient when it is determined that the engine is operating in any of said predetermined particular operating regions;

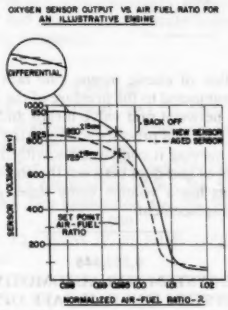
(4) detecting an abnormality in the functioning of said oxygen concentration detecting means; and

(5) applying as one of said at least one coefficient said second coefficient in place of said first coefficient always when an abnormality is detected in the functioning of said oxygen concentration detecting means, irrespective of whether the engine is then operating is said predetermined feedback mode control region or in any of said predetermined particular operating regions.

4,502,444
AIR-FUEL RATIO CONTROLLER

John T. Rubbo, South Amboy; Kenneth R. Burns, Westfield; Ronald M. Heck, Frenchtown, and John J. Early, Perth Amboy, all of N.J., assignors to Engelhard Corporation, Iselin, N.J.

Filed Jul. 19, 1983, Ser. No. 515,695
Int. Cl.³ F02B 3/00
U.S. Cl. 123—440 **20 Claims**



1. In a system having an oxidant-fuel mixture means for control of the oxidant-fuel ratio in an engine burning fuel with an oxidant by use of a sensor of said ratio, a method for controlling said ratio independently of aging of said sensor, said method comprising the steps of:

operating an oxidant-fuel mixture means to vary the oxidant-fuel ratio to increase the richness of the oxidant-fuel mixture,

sensing the richness of the mixture with a sensor providing a signal indicative of said ratio, said step of sensing being repeated to provide a succession of said signals;

determining the differential between successive ones of said signals from each other to obtain a differential signal;

storing the value of the sensor signal when the differential signal is equal to or less than a predetermined amount, said stored value being designated a sensor reference voltage;

calculating a set point voltage for desired oxidant-fuel ratio based on values of the sensor reference voltage; and

operating the oxidant-fuel mixture means to maintain the output of the sensor in the region of the calculated set point voltage.

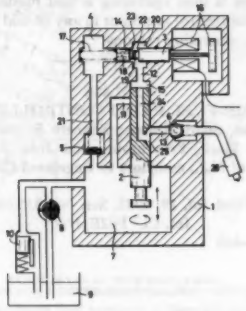
4,502,445
DELIVERY REGULATOR FOR A FUEL INJECTION PUMP

Manuel Roca-Nierga, Leghorn, and Giuliano Lenzi, Arese, both of Italy, assignors to Spica, S.p.A., Leghorn, Italy

Filed Apr. 8, 1983, Ser. No. 483,195
Claims priority, application Italy, Apr. 19, 1982, 20805 A/82
Int. Cl.³ F02M 59/20
U.S. Cl. 123—458 **15 Claims**

1. A fuel injection pump comprising at least one pumping

unit which feeds fuel to at least one injector associated with an internal combustion engine cylinder, a regulator unit for regulating the pumping unit displacement, characterized in that said regulator unit comprises a duct which connects a pump feed pipe to a pressure chamber of said pumping unit successively by way of a non-return valve in parallel with a passage of predetermined size and by way of valve means of which a valving element is moved into the closed state by an actuator



against the action of elastic means, one face of said valving element being subjected to the pressure of the liquid existing in a duct portion between said valve means and said passage of predetermined size, said pressure acting on the valving element in the sense of moving it concurrently with the elastic means, and that portion of said duct between the non-return valve and the valve means has a volume many times greater than the pumping unit displacement.

4,502,446

FAIL-SAFE SYSTEM FOR AUTOMOTIVE ENGINE CONTROL SYSTEM FOR FAIL-SAFE OPERATION AS CRANK ANGLE SENSOR FAILS OPERATION THEREOF AND FAIL-SAFE METHOD THEREFOR, AND DETECTION OF FAULT IN CRANK ANGLE SENSOR

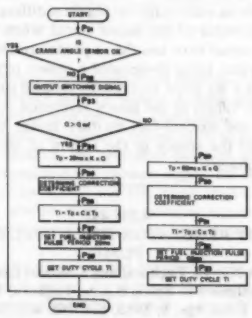
Hidetoshi Kanegae, Tokyo; Katsunori Oshiage, Yokosuka; Akito Yamamoto, and Akio Hosaka, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 29, 1982, Ser. No. 428,059

Claims priority, application Japan, Dec. 10, 1981, 56-197720; Apr. 7, 1982, 57-57667; May 11, 1982, 57-67510; May 13, 1982, 57-79227; May 13, 1982, 57-79228

Int. Cl.³ F02B *3/00*

U.S. Cl. 123—479 **56 Claims**



1. A fail-safe system for an engine control system for an internal combustion engine, comprising:

a crank angle sensor for detecting engine revolution and producing a crank reference signal and a crank position signal, each having a frequency proportional to the engine revolution speed;

a control unit receiving said crank reference signal and said crank position signal and producing a control signal for controlling engine operation on the basis of said crank reference signal, said crank position signal and at least one preselected control parameter;

first means for detecting the absence of at least one of said crank reference signal and said crank position signal and producing a fault signal when the absence of at least one of said signals is detected; and

second means, responsive to said fault signal, for producing a fail-safe signal for controlling said engine operation as a replacement of said control signal, said second means determining a characteristic value of said fail-safe signal on the basis of said at least one preselected control parameter.

4,502,447

METHOD OF AND DEVICE FOR SUPERVISING ELECTRICAL FUEL INJECTION SYSTEMS

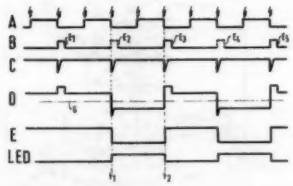
Hans Schnürle, Walheim; Herbert Arnold, Eberdingen, and Michael Horbelt, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 14, 1983, Ser. No. 542,066

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1982, 3238752

Int. Cl.³ G06F *11/00*

U.S. Cl. 123—479 **8 Claims**



1. A method of supervising the operation of a control apparatus which produces control pulses for an electrical fuel injection system of an IC engine, comprising the steps of deriving from a rotary speed information of the engine a train of trigger pulses, synchronizing the trigger pulses with the control pulses, combining the control pulses with the synchronized trigger pulses to produce a train of combined pulses in which in the case of coincidence the trigger pulses merge with the control pulses and are ineffective while in the absence of a control pulse the corresponding trigger pulse becomes effective and triggers an indicating device.

4,502,448

METHOD FOR CONTROLLING CONTROL SYSTEMS FOR INTERNAL COMBUSTION ENGINES IMMEDIATELY AFTER TERMINATION OF FUEL CUT

Yutaka Otobe, Shiki, Japan, assignor to Honda Motor Co., Ltd., Tokyo, Japan

Filed Jun. 3, 1983, Ser. No. 500,780

Claims priority, application Japan, Jun. 18, 1982, 57-104802

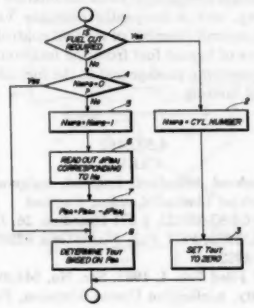
Int. Cl.³ F02M *51/00*

U.S. Cl. 123—480 **11 Claims**

1. A method for controlling a control system for an internal combustion engine having an intake passage and pressure sensor means for detecting pressure in said intake passage, in response to at least one control parameter including values of said intake passage pressure detected by said pressure sensor means, immediately after termination of interruption of fuel supply to said engine, the method comprising the steps of:

(1) detecting whether or not there occurs a transition in the operating condition of said engine from an operating condition requiring interruption of fuel supply to said engine to an operating condition requiring fuel supply to said engine;

(2) changing a value of said intake passage pressure detected by said pressure sensor means, by a predetermined amount corresponding to a difference between a value of intake passage pressure occurring at non-combustion operation



of said engine and a value of intake passage pressure occurring at normal combustion operation of said engine, so long as the rotational speed of said engine is substantially the same between said two operations of said engine, from a time immediately after said transition has been detected to a time said engine finishes a predetermined number of strokes; and

(3) applying a value of said intake passage pressure thus changed, for controlling said control system.

4,502,449

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

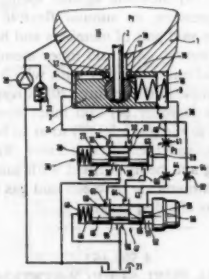
Helmut Laufer, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 19, 1982, Ser. No. 379,805

Claims priority, application Fed. Rep. of Germany, May 30, 1981, 3121635

Int. Cl.³ F02M *59/20*

U.S. Cl. 123—502 **18 Claims**



1. A fuel injection pump for an internal combustion engine which comprises:

a pressure medium supply;

pressure control means for varying the pressure of the pressure medium supply in accordance with rpm;

an adjusting piston which is arranged to effect the adjustment of the instant of injection;

a first work chamber adjacent one end of the adjusting piston;

a second work chamber adjacent an opposite end of the adjusting piston;

a first inflow line, including a first inflow throttle, for connecting the first work chamber to the pressure medium supply, and a first outflow line, connected to the first work chamber and including a first outflow throttle, for relieving pressure in the first work chamber, wherein one of the first inflow and outflow throttles is embodied as a first control valve which is actuatable to control the pressure in the first work chamber;

a second inflow line, including a second inflow throttle, for connecting the second work chamber to the pressure medium supply, and a second outflow line, connected to the second work chamber and including a second outflow throttle, for relieving pressure in the second work chamber, wherein one of the second inflow and outflow throttles is embodied as a second control valve which is actuatable to control the pressure in the second work chamber; and

valve actuating means for actuating the first and second control valves in a complementary direction relative to one another and in common, in accordance with at least one operating parameter.

4,502,450

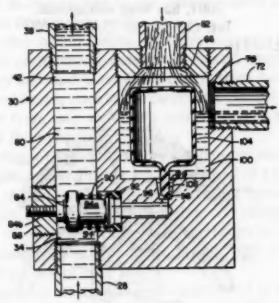
DIESEL FUEL CONTROL VALVE AND SYSTEM

Wayne R. Duprez, Waltham, Mass., assignor to Standard-Thomson Corporation, Waltham, Mass.

Continuation of Ser. No. 303,486, Sep. 18, 1981, Pat. No. 4,452,213, which is a continuation of Ser. No. 57,398, Jul. 13, 1979, abandoned. This application Aug. 31, 1983, Ser. No. 527,990

Int. Cl.³ F02M *37/20*; B01D *53/22*

U.S. Cl. 123—516 **6 Claims**



1. A diesel fuel control valve device for use in a diesel engine fuel supply system provided with a fuel supply tank, a fuel supply conduit extending from the fuel supply tank to the diesel engine, and a heated fuel and air conduit extending from the diesel engine to the fuel supply tank for conducting from the engine a mixture of heated fuel and air entrained in the heated fuel, said fuel control valve device comprising a valve housing which defines a valve chamber provided with an upper portion and a lower portion, said valve housing also defining a fuel supply passage which extends through said valve housing and which is connected to the fuel supply conduit for directing fuel from the fuel supply tank through said fuel supply passage to the diesel engine, said valve housing further defining a fuel recirculating passage connecting said lower portion of said valve chamber to said fuel supply passage with an annular valve seat forming a fluid flow passage leading to said fuel recirculating passage a buoyant vertically movable within said valve chamber, a closure element connected to said

buoyant member and positioned adjacent said annular valve seat for controlling the flow of heated fuel from said valve chamber through said recirculating passage into said fuel supply passage in response to vertical movement of said buoyant member within said valve chamber, said heated fuel and air conduit being connected to said upper portion of said valve chamber and above said buoyant member, the cross-sectional area of said valve chamber with respect to the cross-sectional area of said heated fuel and air conduit being such that all of the mixture of heated fuel and entrained air is directed downwardly within said valve chamber around said valve member while the diesel engine is operating, said buoyant member therefore receiving and sensing the mixture of heated fuel and entrained air flowing downwardly around said buoyant member such that said buoyant member responds to the proportions of heated fuel and air within the mixture while air separates from the mixture for conduction to the fuel supply tank through said heated fuel and air conduit, a thermally responsive valve unit positioned within said valve body at the juncture between said fuel supply passage and said fuel recirculating passage, said thermally responsive valve unit including control means for controlling the flow of heated fuel through said recirculating passage in response to the temperature of the fuel flowing through said fuel supply passage, thus providing a diesel fuel control valve device which is relatively small in physical size and which efficiently uses the return fuel heated by the engine.

4,502,451

DIESEL FUEL CONTROL APPARATUS AND SYSTEM

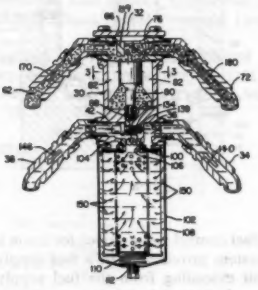
Wayne R. Duprez, Waltham, Mass., assignor to Standard-Thomson Corporation, Waltham, Mass.

Continuation of Ser. No. 411,257, Aug. 25, 1982, Pat. No. 4,454,848, which is a continuation-in-part of Ser. No. 303,486, Sep. 18, 1981, Pat. No. 4,452,213, which is a continuation of Ser. No. 57,398, Jul. 13, 1979, abandoned. This application Aug. 31, 1983, Ser. No. 527,989

The portion of the term of this patent subsequent to Jun. 19, 2001, has been disclaimed.

Int. Cl.³ F02M *55/00, 31/00*

U.S. Cl. 123—516 **7 Claims**



1. For use in a diesel system in which a diesel engine is supplied with fuel from a fuel supply tank and in which the diesel engine consumes a portion of the fuel supplied thereto and in which a mixture of excess heated fuel and entrained air flows from the diesel engine, the combination: a diesel fuel control housing adapted to be attached to a diesel engine, the fuel control housing having a fuel inlet passage for receiving fuel from the fuel supply tank, the fuel control housing having a fuel outlet passage for directing fuel from the fuel control housing to the diesel engine, a diesel fuel filter housing removably attached to the diesel fuel control housing and supported by the diesel fuel control housing, there being a fuel control chamber whthin the fuel control housing, there being a fuel filter chamber within the fuel filter housing and a fuel filter element therewithin, the fuel control housing forming passage means for directing fuel from the fuel inlet passage into the fuel filter chamber of the fuel filter housing and for directing fuel from the fuel filter chamber of the fuel filter housing into the fuel outlet passage of the fuel control housing, the fuel control housing forming a connecting passage between the fuel control chamber and the fuel inlet passage of the fuel control housing, the fuel control housing forming passage means for directing a mixture of excess heated fuel and entrained air into the fuel control chamber from the diesel engine and passage means for directing air which is separated from the mixture from the fuel control housing, and a buoyantly operable valve member within the fuel control chamber of the fuel control housing and controlling flow of heated fuel from the fuel control chamber through the connecting passage and to the fuel inlet passage of the fuel control housing.

4,502,452

VALVE

David A. Whitehead, Stamford, England, assignor to Massey-Ferguson-Perkins Limited, London, England

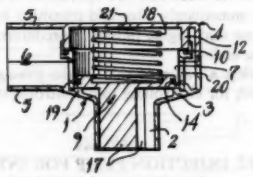
PCT No. PCT/GB83/00023, § 371 Date Sep. 26, 1983, § 102(e) Date Sep. 26, 1983, PCT Pub. No. WO83/02987, PCT Pub. Date Sep. 1, 1983

PCT Filed Feb. 1, 1983, Ser. No. 548,890

Claims priority, application United Kingdom, Feb. 17, 1982, 8204682

Int. Cl.³ F02M *27/00*

U.S. Cl. 123—574 **7 Claims**



1. An internal combustion engine having a crankcase, an induction manifold and a valve to vent gases from the crankcase to the induction manifold when the pressure in the crankcase exceeds atmospheric pressure, characterized in that the valve comprises a housing (1,4) having a gas inlet (2) connected to the crankcase, a gas outlet (6) connected to the induction manifold, inner and outer coaxial members (9,8) with the inner member (9) movable against spring means (18) in response to gas pressure, an annular flexible diaphragm (7) connected between said pair of members and having a portion of U-section that moves with said inner member (9), and an aperture (20) in said outer member with which the diaphragm (7) cooperates to close said aperture (20) in response to movement of said inner member (9) said inner member (9) being located in relation to the gas inlet (2) so as to be responsive to gas inlet pressures, and the outer member (8) being located within the housing and being formed with said aperture (20) therein so as to communicate between said gas inlet and outlet when uncovered by the diaphragm (7).

4,502,453

DUAL FUEL SUPPLY SYSTEM

Daniel F. Kabasin, Rochester, and Donald Stoltman, Henrietta, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

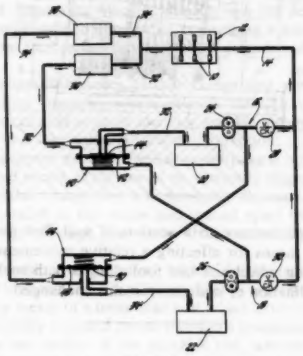
Filed Apr. 3, 1984, Ser. No. 596,315

Int. Cl.³ F02B *75/12*

U.S. Cl. 123—575 **5 Claims**

1. A combustion engine dual fuel supply system comprising two sources of fuel, a fuel delivery unit, a fuel supply passage

extending to said fuel delivery unit and having connections to said sources, control apparatus for at certain times pressurizing the connection of said supply passage to one source to effect fuel flow from said one source through said supply passage to said delivery unit and for at other times pressurizing the connection of said supply passage to the other source to effect fuel flow from said other source through said supply passage to said delivery unit, a first fuel return passage extending from said



supply passage back to said one source and a second fuel return passage extending from said supply passage back to said other source whereby fuel may be circulated from either source through said supply passage and back to the source, and a valve in said second return passage responsive to pressurization of the connection of said supply passage to said one source for obstructing fuel flow through said second return passage to inhibit circulation of fuel from said one source through said supply passage to said other source.

4,502,454

IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

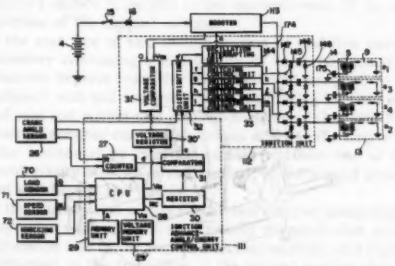
Kyugo Hamai; Meroji Nakai, both of Yokosuka; Ryusaburo Inoue, Yokohama, and Yasuhiko Nakagawa, Kamakura, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jun. 28, 1982, Ser. No. 393,083

Claims priority, application Japan, Jul. 3, 1981, 56-103220; Jul. 3, 1981, 56-103221; Jul. 3, 1981, 56-103222

Int. Cl.³ F02P 9/00

U.S. Cl. 123—597 **25 Claims**



1. An ignition system for a multi-cylinder internal combustion engine, which comprises:

(a) a crank angle sensor for detecting crank angles and generating a plurality of crank angle signals a, b and c corresponding thereto;

(b) a load sensor detecting intake air flow rate of the engine and generating engine load signals Q corresponding thereto;

(c) an engine speed sensor for detecting engine speed and generating engine speed signals N corresponding thereto;

(d) an ignition advance-angle control unit including:

(1) a memory unit for storing reference ignition advance-angle values A corresponding to engine load and engine speed;

(2) a central processing unit connected to said load sensor, said speed sensor, and said memory unit for reading the detected engine load signal Q and engine speed N, determining appropriate reference ignition advance-angle values A corresponding to the detected engine load and engine speed in table look-up method, and executing calculations to obtain advance-angle control signals Nc;

(3) a register connected to said central processing unit for temporarily storing the advance-angle control signals Nc;

(4) a counter connected to said crank angle sensor for counting the crank angle signal c to determine crank angle positions and deriving a counted value d corresponding thereto, said counter being reset by the crank angle signal b; and

(5) a comparator connected to said counter and said register for comparing the counted value d from said counter with the advance-angle control signal Nc from said register and generating ignition signals e when the counted value d matches the advance-angle control signal Nc;

(e) a booster connected to a power supply for boosting a supply voltage of the power supply and deriving a boosted supply voltage corresponding thereto;

(f) an ignition unit including:

(1) a distributing unit connected to said crank angle sensor and said comparator for distributing the ignition signals e from said comparator on the basis of the crank angle signal a from said crank signal sensor and generating output signals f, g, h and i classified into the respective cylinders;

(2) a plurality of switching control units connected to said distributing unit for generating switching control signals j, k, l, and m in response to the output signals f, g, h and i from said distributing unit;

(3) a plurality of thyristors, each having gate and anode terminals respectively connected to said respective control units and said booster, said thyristors being sequentially fired in response to the switching control signals j, k, l, and m from said switching control unit in the ignition order of the cylinders;

(4) a plurality of ignition energy condensers each having a terminal connected to the anode terminal of a separate one of said thyristors for directly charging ignition energy from said booster and discharging the charged ignition energy through said respective thyristors in response to the switching control signals j, k, l, and m from said switching control unit; and

(5) an oscillation interrupting unit connected to said booster and said distributing unit for interrupting the oscillation of said booster for a predetermined period of time during which said condensers are being discharged in order to prevent current from flowing from said booster to said condenser whenever the ignition signals e are derived by said distributing unit;

(g) a plurality of ignition coils, each having a first primary side terminal which is separately connected to a second of one of said ignition energy condensers and a second primary side terminal which is separately connected to the cathode of one of said thyristors for generating high-voltage on the respective secondary side thereof when ignition energy charged in said respective ignition energy condensers is discharged through said thyristors connected to it in response to the switching control signals j, k, l and m from said switching control unit; and

(h) a plurality of ignition plugs, each of the plugs being separately connected to the secondary side of one of said ignition coils so a spark is generated between electrodes of each plug

in response to the high-voltage generated by the ignition coil connected to the plug.

4,502,455

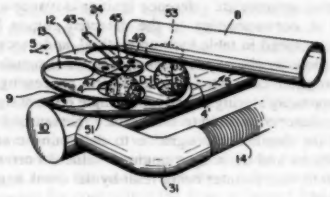
BALL FEEDER FOR THROWING MACHINE

Gilbert A. Stokes, Star Rte., Mountain Ranch, Calif. 95246

Filed Aug. 18, 1983, Ser. No. 524,433

Int. Cl.³ A63B *69/40*; F41F *1/04*

U.S. Cl. 124—50 **2 Claims**



1. A ball feeder for a tennis ball throwing machine, said ball feeder including an upwardly facing ball entranceway and a downwardly inclined ball feed chute, said ball feed chute having a lower end laterally spaced from the entranceway,

a disk having a portion disposed beneath the lower end of the chute while another portion is disposed over the entranceway, said disk having at least one ball pocket extending therethrough,

means for mounting said disk for rotation about a vertical axis and motor means for so rotating said disk,

the disk, the lower end of the chute, and entranceway being so arranged that a tennis ball exiting from the lower end of the chute normally enters the disk pocket and is transported along an arcuate path to the entranceway, there being upwardly facing surface means spaced below said disk for supporting a pocketed tennis ball along said arcuate path, and the lower end of the chute being spaced above the upper surface of the disk by distance less than the diameter of a conventionally sized tennis ball, whereby said tennis ball when not entering a disk pocket becomes an unpocketed tennis ball riding on the disk, which unpocketed ball normally tends to jam between the disk and the chute,

said disk being characterized by flexibility sufficient to permit the same to flex downwardly in response to a downward force resulting from jamming of an unpocketed tennis ball between the upper surface of the disk and the lower end of the chute, said disk being sufficiently flexible to permit a jammed unpocketed tennis ball to escape from between said upper surface and said lower end without interfering with rotation of said disk by said motor means, and

space means providing a ball escape path leading latrally from the space between the lower end of the chute and the upper surface of the disk through which a jammed ball may escape.

4,502,456

APPARATUS FOR DRESSING GRINDING WHEELS

Reinhard Janutta, Geesthacht, and Werner Redeker, Börnsen, both of Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

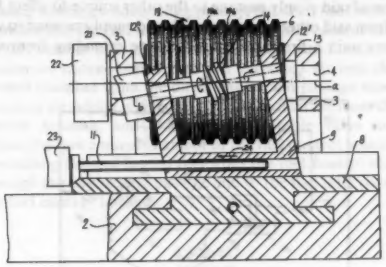
Filed Aug. 19, 1982, Ser. No. 410,082

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1981, 3139940

Int. Cl.³ B24B *53/08*

U.S. Cl. 125—11 CD **9 Claims**

1. In a grinding machine, the combination of a rotary grinding wheel having a first profile which is other than a helical profile and includes a plurality of identical sections disposed one next to the other, as considered in the axial direction of said wheel; a rotary dressing tool whose axis is inclined with reference to the axis of said grinding wheel and whose axial length is a fraction of the axial length of said grinding wheel, said tool having a worm-like second profile at least substantially complementary to a section of said first profile; and advancing means for effecting a relative movement between said grinding wheel and said tool along a path such that the mutual inclination of said axes remains unchanged.



4,502,457

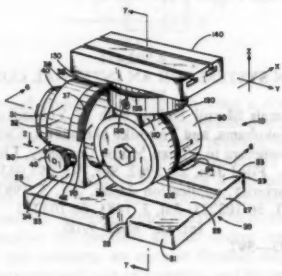
UNIVERSAL MULTIPLE ANGLE WORK PIECE HOLDER WITH MULTIPLE TOOL CONVERSION FEATURES

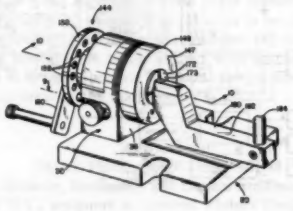
Antonio G. Marron, Inglewood, Calif., assignor to Raul C. Montoya, Los Angeles and Victor G. Marron, Inglewood, both of, Calif.

Filed Aug. 27, 1982, Ser. No. 412,301

Int. Cl.³ B24B *53/00, 41/06*; B23Q *1/04*; B25B *1/22*

U.S. Cl. 125—11 A **10 Claims**





1. A Multiple Angle Work Piece Holder assembly for positioning a work piece holding member and work piece held therein above a flat supporting surface at any selected angular position in each of three planes, comprising:

(a) a base member adapted to rest upon a flat supporting surface;
(b) said base member containing a multiplicity of edges and an upper and lower surface;
(c) a support member rigidly attached to the upper surface of said base member and adjacent its rear edge, and extending vertically upward therefrom;
(d) the lower portion of said support member containing two substantially vertically disposed sides which extend into a curved upper area which terminates in a 180 degree arc;
(e) said support member further comprising a substantially flat front face and a rear face which extends radially outward;
(f) said support member further comprising a transverse cylindrical opening which extends through the entire thicknss of said support member and having its axis disposed in a substantially horizontal direction;
(g) said support member further comprising a horizontally disposed recess along one of its vertically disposed sides, and further comprising a horizontally disposed hole running parallel to the recess and spaced apart from it and extending through the entire thickness of the support member;
(h) a movable rod contained within the horizontally disposed hole and capable of being slidably moved within the hole by means of a transverse bolt which extends from the horizontally disposed recess through a transverse opening and to the surface of the movable rod, whereby the rod can be caused to protrude through the front face and the rear face of the support member;
(i) a degree scale containing approximately 180 degrees placed upon the curved upper portion of the support member and adjacent its front face;
(j) a first swivel member positioned beside said support member;
(k) said first swivel member being of one piece construction and containing four distinct sections, a first section, a second section, a third section and a fourth section;
(l) said first section of said first swivel member being a horizontally disposed cylinder with a flat rear face a flat front face, the rear face containing a central threaded cylindrical opening which extends into the cylinder;
(m) the diameter of said first section being accommodated within said transverse cylindrical opening in said support member, whereby said first section rotatably supports said first swivel member from said support member and is locked in place by means of a threaded bolt extending into said threaded cylindrical opening in the first section;
(n) said second section of said first swivel member being a horizontally disposed solid cylinder whose diameter is greater than the diameter of the first section, the second section containing a rear face integral with the front face of said first section such that both sections share a common horizontal axis and wherein the circumference of the second section is parallel to the circumference of the arc portion of the support member;
(o) the rear face of said second section of said first swivel member containing a multiplicity of holes positioned at various degrees from the horizontal, and designed to be aligned with and accommodate a protruding forward end of said rod within said support member so that said first swivel member can quickly be set at a specific degree to the horizontal by insertion of said rod into one of the multiplicity of holes in the rear face of the second section of said first swivel member;
(p) the third section of said first swivel member being a solid cylinder whose axis is substantially perpendicular to the common axis of the first and second sections, and rigidly attached to the front face of the second section along a portion of its circumference, such that the rear face of the third section is substantially parallel to one portion of the circumference of the second section;
(q) the fourth section of said first swivel member being a solid cylinder extending from the front face of the third section such that they share a common axis, with the front face of the fourth section containing a threaded cylindrical opening extending into the cylinder;
(r) said first swivel member being spaced a sufficient distance above said base member so that its second, third and fourth sections will not directly engage the base member when the first swivel member is rotated upon the first section;
(s) a seacond swivel member positioned beside said first swivel member and rotatably supported from the fourth section of said first swivel member;
(t) said second swivel member being of one piece construction and containing three distinct sections; a fifth section, a sixth section and a seventh section;
(u) said fifth section of said second swivel member being a toroidal cylinder whose outer diameter is substantially the same as the outer diameter of said third section and whose circumference contains a degree scale of 360 degrees adjacent its rear face;
(v) the interior of said fifth section containing a central opening which is designed to accommodate the cylindrical fourth section of said first swivel member;
(w) said fifth section being thereby movably attached to said fourth section by means of a threaded bolt which extends from a front face of said fifth section into the threaded opening in said fourth section, whereby the rear face of said fifth section is adjacent the front face of said third section;
(x) said sixth section being a mating section and rigidly attached to the circumference of said fifth section and adjacent its front face, to thereby provide a connection and separation between the fifth section and the seventh section;
(y) said seventh section being a cylinder whose axis is approximately perpendicular to the axes of the first and fourth sections, and joined to the sixth section at a portion of its lower face such that a portion of the circumference of the seventh section is substantially parallel to a front face of the fifth section.
(z) said seventh section containing a deep cylindrical recess which begins at its upper face and extends through most of the thickness of the seventh section;
(aa) a third swivel member rotatably supported by the seventh section of said second swivel member;
(bb) said third swivel member being a solid cylinder whose diameter is substantially the same as the diameter of said seventh section, and containing a stem extending from its lower surface which is accommodated within the cylindrical recess of said seventh section and tightened within it by means of a transverse screw within a wall of the seventh section;
(cc) the circumference of said third swivel member containing a 360 degree scale adjacent its lower surface;
(dd) the upper surface of said third swivel member containing means to rigidly retain a work piece holder; and
(ee) the diameter of the cylinders about which the swivel members rotate, which are the first and fourth sections of the first swivel member and the stem of the third swivel member being thick as compared to their lengths;
(ff) whereby the work piece holding member and work piece contained therein may be selectively supported at any three-dimensional angular position relative to said base by means of rotation of said swivel members with respect to each other and to said support member along their respective cylinders and in accordance with the degree scale markings.

10. A tool which can be converted from a multiple angle work piece holder assembly into a dresser, wherein the multiple angle work piece holder assembly contains the following elements: (a) a base member adapted to rest upon a flat supporting surface, (b) the base member containing a multiplicity of edges and an upper and lower surface, (c) a support member rigidly attached to the upper surface of said base member and adjacent its rear edges, and extending vertically upward there-

from, (d) the lower portion of the support member containing two substantially vertically disposed sides which extend into a curved upper area which terminates in a 180 degree arc, (e) the support member further comprising a substantially flat front face and a rear face which extends radially outward, (f) the support member further comprising a transverse cylindrical opening which extends through the entire thickness of the support member and having its axis disposed in a substantially horizontal direction, (g) the support member further comprising a horizontally disposed recess along one of its vertically disposed sides, and further comprising a horizontally disposed hole running parallel to the recess and spaced apart from it and, (h) a movable rod contained within the horizontally disposed hole and capable of being slidably moved within the hole by means of a transvere bolt which extends from the horizontally disposed recess through a transverse opening and to the surface of the movable rod, whereby the rod can be caused to protrude through the front face and the rear face of the support member, (i) a degree scale containing approximately 180 degrees place upon the curved upper portion of the support member and adjacent its front face, (j) a first swivel member positioned beside said support member, (k) the first swivel member being of one piece construction and containing four distinct sections, a first section, a second section, a third section and a fourth section, (l) the first section of the first swivel member being a horizontally disposed cylinder with a flat rear face, a flat front face, with the rear face containing a central threaded cylindrical opening which extends into the cylinder, (m) the diameter of the first section being accommodated within the transverse cylindrical opening in the support member, whereby the first section rotatably supports the first swivel member from the support member and is locked in place by means of a threaded bolt extending into the threaded cylindrical opening in the first section, (n) the second section of the first swivel member being a horizontally disposed solid cylinder whose diameter is greater than the diameter of the first section, the second section containing a rear face integral with the front face of the first section such that both sections share a common horizontal axis and wherein the circumference of the second section is parallel to the circumference of the arc portion of the support member, (o) the rear face of the second section of the first swivel member containing a multiplicity of holes positioned at various degrees from the horizontal, and designed to be aligned with and accomodate a protruding forward end of the rod within the support member so that the first swivel member can quickly be set at a specific degree to the horizontal by insertion of the rod into one of the multiplicity of holes in the rear face of the second section of the first swivel member, (p) third section of the first swivel member being a solid cylinder whose axis is substantially perpendicular to the common axis of the first and second sections, and rigidly attached to the front face of the second section along a portion of its circumference, such that the rear face of the third section is substantially parallel to one portion of the circumference of the second section, (q) the fourth section of the first swivel member being a solid cylinder extending from the front face of the third section such that they share a common axis, with the front face of the fourth section containing a threaded cylindrical opening extending into the cylinder, (r) the first swivel member being spaced a sufficient distance above the base member so that its second, third and fourth sections will not directly engage the base member when the first swivel member is rotated upon the first section (s) a second swivel member positioned beside said first swivel member and rotatably supported from the fourth section of the first swivel member, (t) the second swivel member being of one piece construction and containing three distinct sections, a fifth section, a sixth section and a seventh section, (u) the first section of the second swivel member being a torroidal cylinder whose outer diameter is substantially the same as the outer diameter of the third section and whose circumference contains a degree scale of 360 degrees adjacent its rear face, (v) the interior of the first section containing a central opening which is designed to accommodate the cylindrical fourth section of the first swivel member, (w) the fifth section being thereby movably attached to the fourth section by means of a threaded bolt which extends from a front face of the fifth section into the threaded opening in the fourth section, whereby the rear face of the fifth section is adjacent the front face of the third section, (x) the sixth section being a mating section and adjacent its front face, to thereby provide a connection and separation between the fifth section and the seventh section, (y) the seventh section being a cylinder whose axis is approximately perpendicular to the axis of the first and fourth sections, and joined to the sixth section at a portion of its lower face such that a portion of the circumference of the seventh section is substantially parallel to a front face of the fifth section, (z) the seventh section containing a deep cylindrical recess which begins at its upper face and extends through most of the thickness of the seventh section, (aa) a third swivel member rotatably supported by the seventh section of the second swivel member, (bb) the third swivel member being a solid cylinder whose diameter is substantially the same as the diameter of the seventh section, and containing a stem extending from its lower surface which is accommodated with the cylindrical recess of the seventh section and tightened within it by means of a transverse screw within a wall of the seventh section, (cc) the circumference of the third swivel member containing a 360 degree scale adjacent its lower surface, (dd) the upper surface of the third swivel member containing means to rigidly retain a work piece holder, whereby the multiple angle work piece holder assembly can be converted into a dresser by remvoing the movable rod from the support member and thereby removing the first, second and third swivel members from the tool, and substituting therefor the following elements to form a dresser further comprising:

(a) a hollow shaft placed through the transverse cylindrical opening in said support member, the front of the shaft containing a collar which abuts the front face of said support member;

(b) a chuck inserted into said hollow shaft such that its receiving end protrudes through the collar and its rear end protrudes through the rear face of said support member;

(c) means to firmly secure the chuck within said hollow shaft and within said support member;

(d) a dresser containing a shaft which is inserted into said chuck such that the front portion of the dresser protrudes through the collar and extends from the chuck and from the front face of said support member; and

(e) a cutter held adjacent the remote portion of the protruding end of the shaft.

4,502,458

APPARATUS FOR TRUING A GRINDING WHEEL

Kunihiko Unno; Toshio Tsujiuchi, and Yukio Oda, all of Kariya, Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Jan. 19, 1983, Ser. No. 459,217

Claims priority, application Japan, Feb. 15, 1982, 57-18580[U]

Int. Cl.³ B24B *53/06*

U.S. Cl. 125—11 R **11 Claims**

1. An apparatus for truing a grinding wheel having a grinding surface, comprising:

a base;

a support movably mounted on said base for movement in a first direction parallel to the grinding surface;

a carrier movably supported on said support for movement in a second direction perpendicular to said first direction;

a truer supported on said carrier;

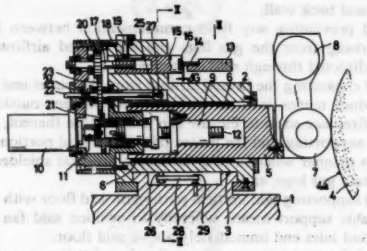
first and second numerically controlled means for respectively moving said support and said carrier during a truing operation in which the grinding wheel is trued by said truer;

a stylus supported on said support and movable in said second direction;

synchronous drive means for moving said stylus in synchronism with the movement of said carrier during the turing operation;

means for disconnecting said synchronous drive means only during an infeed operation at a position lateral of said grinding wheel; and

a safety template mounted on said base in confronting relation to said stylus with a gap continually defined therebetween during a normal truing operation, said safety template having a profile corresponding to said grinding wheel, whereby said stylus can abut against the said template only when said carrier is excessively fed toward the grinding wheel due to malfunction of said second feed means, thereby preventing said stylus and said carrier from further moving toward the grinding wheel.

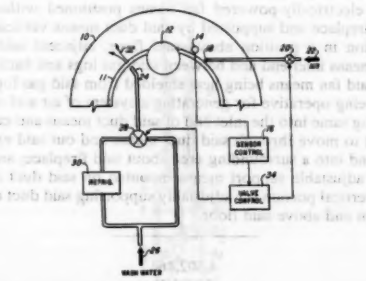


4,502,459

CONTROL OF INTERNAL DIAMETER SAW BLADE TENSION IN SITU

Lawrence D. Dyer, Richarson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 4, 1982, Ser. No. 432,509
Int. Cl.³ B28D *10/4*; B24B *49/00*
U.S. Cl. 125—13 R **6 Claims**



1. A method for controlling the tension of an internal diameter saw blade while sawing an object; comprising the steps of:

directing a stream of fluid onto the cutting edge of said saw blade after said blade passes through the object being sawed;

regulating the temperature of said fluid to control blade tension; and

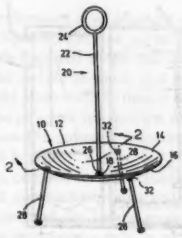
measuring the tension of said saw blade and regulating said fluid temperature responsive thereto.

4,502,460

COTTAGE GRILL

Reinhard Kelz, Thornhill, Canada, assignor to Gypsy Pan Limited, Markham, Canada

Filed Oct. 28, 1983, Ser. No. 546,583
Claims priority, application Canada, Nov. 12, 1982, 415378
Int. Cl.³ F24C *1/16*
U.S. Cl. 126—29 **18 Claims**



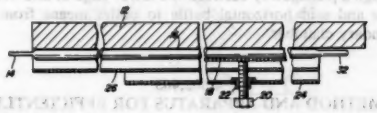
1. A cooking apparatus comprising a metal dish presenting a shallow upper, concave cooking surface and a lower, convex heat absorbing surface, means beneath and detachably connected to the lower surface providing multi-point support for the latter in a stable, freestanding position above a fire supporting surface, a handle located sufficiently vertically above the centre of said upper cooking surface to remain relatively cool during cooking, and vertical rod means extending between the handle and a detachable connection to the dish concentric with the centre of the upper surface, whereby the metal dish is suspended in a stable orientation beneath the handle when the latter is lifted.

4,502,461

GRIDDLE CONTROL FOR MINIMUM TEMPERATURE VARIATION

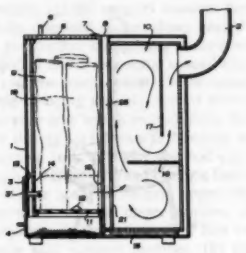
Richard T. Keating, Oak Park, Ill., assignor to Keating of Chicago, Inc., Bellwood, Ill.

Filed Apr. 11, 1983, Ser. No. 483,524
Int. Cl.³ F24C *3/00*
U.S. Cl. 126—39 K **4 Claims**



1. A heat control means for a cooking griddle plate comprising a source of thermal energy directly applied to the bottom side of the plate to heat the same and means for on-off operation of said energy source, said heat control means comprising an elongated temperature responsive body having a major portion of its length firmly positioned against the bottom side of said plate, and means spaced from said body for shielding substantially the entire length thereof, adjustable means for clamping the temperature responsive body against the bottom of said plate, said adjustable means extending through said shielding means and allowing said temperature responsive body to be moved longitudinally to directly expose a desired portion to and thermally influenced by said energy source.

4,502,462
WOOD STOVE
Brent Lawrence, 2408 Broadway NE., Albuquerque, N. Mex. 87102
Filed Nov. 12, 1982, Ser. No. 440,989
Int. Cl.³ F24C 1/14
U.S. Cl. 126—77 2 Claims



1. A stove for burning solid carbonaceous fuel comprising an elongated vertical primary combustion chamber having a sealable top plate and a sealed bottom plate, an elongated vertical secondary combustion chamber having sealed bottom and top plates, said combustion chambers being spaced from one another and connected to each other along their length to provide a secondary air inlet passage to said second chamber of preheated air, grate means positioned in the lower most portion of said primary chamber, unobstructed primary air passage means diametrically placed in the front and rear walls of said primary chamber at the level of said grate means, unobstructed air passage means in the front wall of said secondary chamber at the level of the air passage means in the rear wall of said primary chamber and cooperating with said secondary air inlet passage for the influx of heated secondary air into said secondary chamber, control means for the primary air passage means in the front wall of said primary chamber, a horizontal baffle extending forwardly from the rear wall of the secondary chamber a predetermined distance to provide at least partial retention of the burning gases from said primary chamber within the lower portion of said secondary chamber for mixing with said secondary air before passing said burning gases into the upper portion of said secondary chamber between the inner edge of said horizontal baffle and the front wall of said secondary chamber, a vertical baffle depending from the top plate of said secondary chamber toward said horizontal baffle for additional retention and complete combustion of said burning gases and secondary air mixture before passing any mixture residue through a passageway between the lower edge of said vertical baffle and said horizontal baffle to outlet means from said secondary chamber.

4,502,463
METHOD AND APPARATUS FOR EFFICIENTLY CAPTURING AND DISTRIBUTING HEAT PRODUCED BY GAS LOGS
Willis H. Gregory, Rte. 2, Angier, N.C. 27501
Filed Apr. 26, 1984, Ser. No. 604,173
Int. Cl.³ F24B 7/00
U.S. Cl. 126—121 7 Claims

1. A method for capturing heat produced by gas logs located within and spaced forwardly of the back wall of a fireplace having spaced-apart side walls, said back wall, a floor and a flue, said heat normally being at least partially exhausted from the fireplace through the flue, comprising the steps of:

(a) positioning electrically-powered air fan means in said fireplace between the gas logs and said fireplace back wall;

(b) operating said air fan means so as to pull air into said fan and to create an airflow from air proximate to said floor which has not been substantially heated by the gas logs;

(c) directing the airflow into the inlet end of a single enclosed sheet metal formed duct means having no flow obstruction therein and at least a portion that extends generally horizontally over the gas logs within said fireplace so as to heat the airflow through the duct means and a communicating vertical portion between said gas logs and back wall;

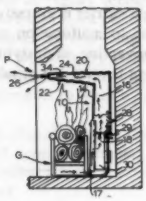
(d) preventing any fluid communication between hot air rising from the gas logs and the heated airflow being directed through said duct means;

(e) exhausting the heated airflow from the outlet end of said duct means into an ambient environment outside said fireplace so as to elevate the temperature thereof;

(f) supporting said fan means on said vertical portion and in a manner wherein said fan means are heat shielded from said gas logs; and

(g) supporting said vertical portion on said floor with adjustable support means whereby to position said fan means and inlet end immediately above said floor.

7. A heating apparatus for a fireplace having spaced-apart side walls, a back wall, a floor, and a flue, comprising:



(a) gas logs operatively positioned in said fireplace between said sidewalls, forward of said back wall, above said floor and below said flue;

(b) integrally-formed single duct means formed of sheet metal and enclosed along the length thereof and having inlet and exhaust ends with no flow obstruction therein, a horizontal portion extending generally over said gas logs and of progressively diminishing cross-sectional area in the air passage direction and a vertical portion positioned below said horizontal portion and between said gas logs and back wall;

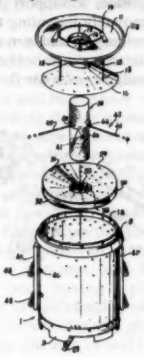
(c) electrically-powered fan means positioned within said fireplace and supported by said duct means vertical portion in a position above said floor, adjacent said duct means inlet end and between said gas logs and back wall, said fan means being heat shielded from said gas logs and being operative for generating a system of air and directing same into the inlet end of said duct means and causing it to move through said duct means and out said exhaust end into a surrounding area about said fireplace; and

(d) adjustable support means mounted on said duct means vertical portion for adjustably supporting said duct means on and above said floor.

4,502,464
STOVE
Alberto A. Figueroa, San Lorenzo, Gapan, Nueva Ecija, Philippines
Filed Feb. 8, 1984, Ser. No. 577,982
Claims priority, application Philippines, Feb. 23, 1983, 28556
Int. Cl.³ F23M 5/00; F24B 13/02
U.S. Cl. 126—163 R 5 Claims

1. A stove comprising a cylindrical body open at the top and having a bottom wall and a support at the bottom thereof, said cylindrical body having a plurality of circumferentially disposed holes at the sides thereof which holes increase and size

towards the top thereof, said bottom wall has several circularly spaced apart openings at the central portion thereof, an adjustable primary air control means disposed below said bottom wall, an air-gas vapor chamber disposed above said bottom wall and communicating therewith, said air-gas vapor chamber unit having a downwardly extending short cylindrical member having circumferential openings, a vertical cylindrical screen



fuel support disposed centrally of said cylindrical body with the bottom thereof substantially extending to said short cylindrical portion and communicating with said air-gas vapor chamber, a detachable cover disposed on top of said cylindrical body, said cover having a centrally disposed flame opening, a cooking utensil support at the topside thereof and a top fuel shield suspended below said detachable cover.

4,502,465

CATALYST COMBUSTION CURLING DEVICE

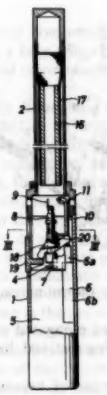
Sadao Yoshinaga, Ichikawa; Yoshinobu Tajiri, Ohsaka, and Hiroyoshi Mashine, Soka, all of Japan, assignors to Prince Industrial Development Co., Ltd., Tokyo and Koizumi Sangyo Co., Ltd., Ohsaka, both of, Japan

Filed Jul. 21, 1983, Ser. No. 515,871

Claims priority, application Japan, Jul. 22, 1982, 57-128133; Jun. 15, 1983, 58-91550[U]; Jul. 11, 1983, 58-107395[U]

Int. Cl.³ A45D *1/04*

U.S. Cl. 126—409 **18 Claims**



1. A catalyst combustion curling device, comprising:

a handle;

a liquefied gas tank disposed within said handle;

a heating barrel mounted on said handle to serve as one of a curling iron and a member for mounting the teeth of a comb;

a combustion valve provided on said liquefied gas tank;

a catalytic member disposed within said heating barrel for combusting liquefied gas supplied through said combustion valve;

a piezo-electric device having a first electrode disposed within said handle and to the side of said liquefied gas tank;

a nozzle member disposed in said handle and in communication with said liquefied gas tank via said combustion valve;

a second electrode disposed within said handle and in spaced relation to said nozzle member and proximate said first electrode of said piezo-electric device to generate therebetween a discharge spark for ignition of liquefied gas;

an operator accessible actuator mounted for motion with respect to said handle;

an ignition lever, coupled to said actuator, operatively connected to said combustion valve and said piezo-electric device, and mounted for rotary motion with respect to said handle in response to motion of said actuator, said ignition lever having two ends, and a cam-like portion intermediate said two ends that is rotatable for opening and closing said combustion valve, said lever having one of said ends operatively connected to said actuator for initiating rotation thereof, and having the other of said ends operatively connected to said piezo-electric device to produce said spark upon rotation of said ignition lever by means of said actuator.

4,502,466

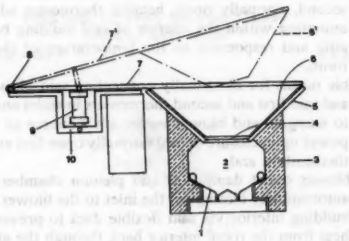
PROTECTIVE SHIELD FOR A SOLAR ENERGY CONCENTRATOR

Per G. Grahn, Lund, Sweden, assignor to United Stirling AB, Malmo, Sweden

Filed Nov. 30, 1983, Ser. No. 556,685

Int. Cl.³ F24J *3/02*

U.S. Cl. 126—418 **4 Claims**



1. A shield for protecting a solar energy concentrator disposed proximate the open apex of a frusto-conical receiver body, said shield comprising:

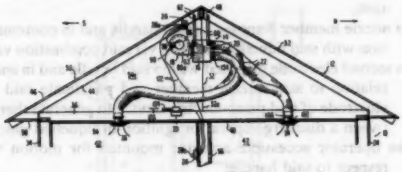
(a) a metal net having frusto-conical shape corresponding to the shape of said receiver body; and

(b) means supporting said net for moving said net between a first position juxtaposed the inside surface of said receiver body and surrounding said open apex to allow insolation of said concentrator and a second position displaced from said receiver body in the path of solar radiation directed to said concentrator to at least partly prevent insolation of said concentrator.

4,502,467
COMPACT ATTIC MOUNTED SOLAR HEATING PACK ASSEMBLY

David C. Smith, Rte. 3, Box 630, Proctorville, Ohio 45669

Filed Jun. 20, 1984, Ser. No. 622,594
Int. Cl.[3] F24J 3/02
U.S. Cl. 126—429 6 Claims



1. A compact attic solar heating pack assembly for mounting within a building attic having diagonally opposed south and north facing roof sections overlying a horizontal building attic floor forming the ceiling and defining an enclosed attic space above the occupied room space below the ceiling, said building further including vented eaves opening to the attic enclosure at the bottom thereof, said pack assembly comprising:

a closed sheet metal plenum,

means for fixedly mounting said plenum within said attic just below at said apex,

a blower fixedly mounted to the plenum, said blower having an air inlet open to the attic enclosure,

said blower including a blower outlet opening to the interior of the plenum,

an electric motor for driving said blower,

a plurality of air outlets within said plenum,

flexible ducts coupled at one end to said plenum chamber outlets, respectively, and terminating at their other ends in diffusers, said diffusers being mountable within said attic floor and opening through the ceiling for delivering air from said plenum chamber to the interior occupied rooms of the building,

a first, normally open, cooling thermostat adapted for mounting within said attic enclosure adjacent said apex and responsive to a substantial increase in temperature of the air within the attic enclosure over the outside air based on direct solar radiation through said south facing attic roof section,

a second, normally open, heating thermostat adapted for mounting within the interior of said building below said attic and responsive to the temperature of the interior room,

cable means for electrically connecting said blower motor and said first and second thermostats in series and adapted to energize said blower motor via a source of electrical power upon closure of said normally open first and second thermostats, and

a blower outlet damper at said plenum chamber inlet for automatically closing off the inlet to the blower from the building interior via said flexible duct to prevent loss of heat from the room interior back through the attic.

4,502,468
ADJUSTABLE SPECULUM WITH INCORPORATED LIGHTING SYSTEM

Kermit H. Burgin, R.R. #1, Box 334, Whitestown, Ind. 46075

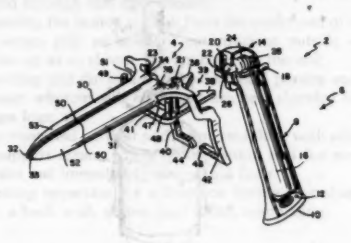
Continuation-in-part of Ser. No. 105,509, Dec. 20, 1979, Pat. No. 4,344,419, and a continuation-in-part of Ser. No. 354,812, Mar. 4, 1982, , and a continuation-in-part of Ser. No. 284,484, Jul. 17, 1981, abandoned. This application Jul. 1, 1982, Ser. No. 394,291
Int. Cl.[3] A61B 1/00, 1/32, 1/06
U.S. Cl. 128—18 5 Claims

1. A speculum comprising

a base unit having a handle portion and a head portion, said head portion comprising a first front surface and two side surfaces adjacent the front surface,

a light source mounted in the base unit for providing light in the head portion of the base unit,

a speculum head constructed from a resilient material, the speculum head having two blade-like contacting members for dilating an orifice, a support means, and moving mounting means movably mounting the contacting members on said support means, said movable means including two posts, each contacting member being unitarily formed with one of the resilient posts for flexible resilient move-



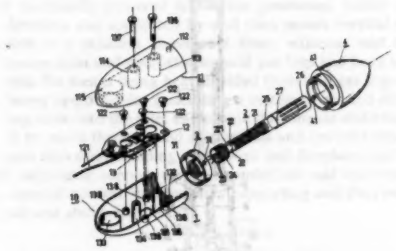
ment generally about the axis of its repective post upon urging by an operator, releasing of the contacting member urging forces permitting the contacting members to return to their undeflected positions, and

attachment means removably securing the speculum head to the head portion of the base unit adjacent the light source, said attachment means including means providing grooves extending at least partially across said two side surfaces, said speculum head including a proximal end portion complementarily configured to the grooves for insertion into the grooves.

4,502,469
MILD-TEMPERATURE THERMOMASSAGE INSTRUMENT

Jih-long Jaw, 105 Ta-Tung South St., Son-Ho Li, Nan-Tou Town, Nan-Tou Hsien, Taiwan

Filed Jul. 26, 1982, Ser. No. 402,144
Int. Cl.[3] A61H 29/00
U.S. Cl. 128—24.1 9 Claims



6. A mild-temperature thermomassage instrument comprising:

a hollow and truncated elongated oval body made of heat resistant and insulating material, having an open truncated end;

a flat wiring plate made of heat resistant and insulating material disposed in said body;

a pair of powerlines connected to said plate;

button switch means engaged with said plate and said powerlines and movable in said body for supplying heating power;

a hollow and truncated eliptical front head made of metal, defining an inner space and having an open truncated end connected to said open truncated end of said body;

a rod shaped heating device extending into said inner space and spaced inwardly from said head, said heating device being electrically connected to said button means for receiving heating power for heating said inner space and said head;

a mounting member made of heat resistant and insulating material connected to said body and to one end of said rod shaped heating device for supporting said rod shaped heating device in said inner space of said head;

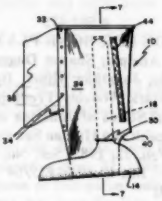
said rod shaped heating device including a refractory core rod having a hollow screw base at said one end thereof, an electric resistance wire wound on said refractory core rod having connecting wires extending through said hollow screw base for connection to said button switch means and powerlines, said mounting member comprising a ring having an inner threaded portion threadably engaged with said hollow screw base and an outer portion with a plurality of peripheral openings, said hollow and truncated elongated oval body having a plurality of projections equal in number to said plurality of holes in said ring and extending respectively into said plurality of holes in said ring for securing said ring in said head.

4,502,470

PHYSIOLOGIC DEVICE AND METHOD OF TREATING THE LEG EXTREMITIES

John L. Kiser, 3243 E. Murdock #400, Wichita, Kans. 67208, and Vernon D. Griffith, 9011 Warren, Wichita, Kans. 67212

Filed Sep. 16, 1982, Ser. No. 418,763
Int. Cl.³ A61H 7/00
U.S. Cl. 128—64 **5 Claims**



1. A physiologic device comprising a generally U-shaped reservoir means having a base and a pair of extending essentially upright arms in fluid communication with the base of the reservoir means;

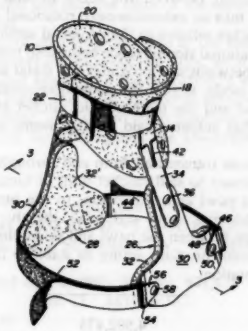
a fluid means partially filling said reservoir means; and a sheath means adapted to be wrapped around the lower extremity of a person's leg comprising upwardly extending side portions adapted to substantially encircle the ankle and lower leg, the side portions comprising a pair of edges having fastening means for releasably fastening the same to one another thereby securing the sheath means to the lower extremity of a person's leg; said sheath means further comprising a lower base portion, between the side portions, adapted to substantially encircle the foot, having opposed aperture means for receiving the reservoir arms and holding the same in the proximity of the side portions of the sheath means; wherein the reservoir means is releasably connected to the sheath means by the aperture means such that the base of the reservoir means is positioned outside of the sheath means and the arms of the reservoir means are positioned within the sheath means; thereby providing pressure pulsations, developed at the base of the reservoir means and produced by walking, to be transmitted to the arms of the reservoir means and lower extremity of the leg where a pathological condition may exist.

4,502,471

STABILIZER FOR CERVICAL COLLAR

Troy R. Owens, Galveston, Tex., assignor to Charles Greiner And Company, Inc., Westville, N.J.

Filed Sep. 15, 1982, Ser. No. 418,505
Int. Cl.³ A61H 1/02
U.S. Cl. 128—75 **11 Claims**



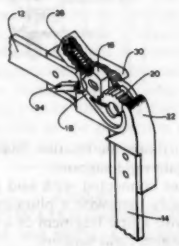
1. A stabilizing system comprising a body stabilizer and a self supporting cervical collar; said collar having U-shaped front and rear halves of soft flexible plastic with overlapping ends when encircling around a wearer's neck; and each half having a short rigid member thereon, said body stabilizer having a front piece adapted to overlie part of a person's chest and a rear piece adapted to overlie part of a person's back, adjustable strap means for encircling a portion of a person's body for removably interconnecting said front piece with said rear piece; and means on the upper end of said front and rear pieces for rigidly and removably connecting said front piece and rear piece respectively to said rigid members on said collar so that said front and rear pieces provide temporary support for said cervical collar and can be separated from said collar while said collar remains intact to support the wearer's neck.

4,502,472

HINGE MEANS FOR ORTHOPEDIC BRACE

Timothy T. Pansiera, 1335 N.E. 28th St., Pompano Beach, Fla. 33064

Filed Sep. 12, 1983, Ser. No. 531,991
Int. Cl.³ A61F 3/00
U.S. Cl. 128—80 F **6 Claims**



1. A hinge means for an orthopedic brace having proximal and distal sections, comprising:

(a) a rotatable, substantially circular, double-toothed pawl slidably encased in a cylindrical housing integrally depending from the proximal section of the orthopedic brace;

(b) a ratchet depending integrally from a pivot area of the distal section of the orthopedic brace, said ratchet having

a plurality of its teeth extending into a circular open area of said housing;

(c) release means for pivotally disengaging said teeth of said double-toothed pawl from said ratchet, thereupon permitting free, non-engaged movement of the distal section relative to the proximal section of the brace;

(d) biasing means for selectively urging, in a first mode, an engagement between the teeth of said pawl and said ratchet into an extension-only rotational step-advance of said ratchet relative to the proximal section of said brace, said rotational step-advance being also relative to the joint center between said proximal and distal sections, and in a second mode, urging the non-engagement of the teeth of the pawl and the teeth of said ratchet after said release means has actuated said biasing means into said second mode,

whereby forces transmitted from and through said distal section of the brace to said ratchet will, in turn, be transmitted through said pawl and, therefrom, to the inner wall of said cylindrical housing about said pawl, thereby exerting multi-point pressure between the pawl and said cylindrical housing, such multi-point pressure acting to stabilize the joint against unwanted rotation.

4,502,473

APPARATUS FOR EXTERNAL FIXATION OF BONE FRACTURES

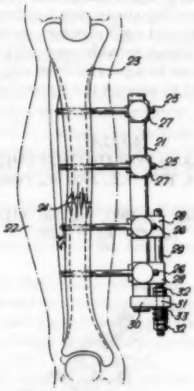
John D. Harris, Abingdon, and Mervyn Evans, Kidlington, both of England, assignors to National Research Development Corp., England

Filed Aug. 2, 1982, Ser. No. 404,498

Claims priority, application United Kingdom, Aug. 6, 1981, 8124043

Int. Cl.³ A61F 5/04

U.S. Cl. 128—92 A **20 Claims**



1. An external orthopaedic fracture fixator comprising:

a primary elongate rigid support;

first clamp means connected with said primary support to secure adjustably therewith a plurality of first bone pins transfixable with a first fragment of a fractured bone;

a secondary elongate rigid support;

a second clamp means connected with said secondary support to secure adjustably therewith a plurality of second bone pins transfixable with a second fragment of said bone;

a linkage respectively fixable and slidably connected with said primary and secondary supports to hold said primary and secondary supports in parallel side-by-side relationship;

a seat connected with said secondary support;

compression spring means acting between said linkage and said seat to bias said primary and secondary supports into relative movement to separate said first and second clamp means; and

a stop connected with one of said supports and cooperable with said linkage to limit the bias action of said spring.

4,502,474

BONE WEDGE GUIDANCE SYSTEM

John E. Comparetto, P.O. Box 433, Nassawadox, Va. 23413

Continuation-in-part of Ser. No. 294,653, Aug. 20, 1981, and a continuation-in-part of Ser. No. 127,010, Mar. 4, 1980, abandoned. This application Sep. 28, 1982, Ser. No. 425,574

Int. Cl.³ A61F 5/04

U.S. Cl. 128—92 H **16 Claims**

1. Osteotomy guide apparatus comprising an arcuate tab section, a guide body disposed on said tab section, a guide arm extending from said guide body with a guide slot positioned therein, means on said tab section cooperating with means on said guide body for adjustably positioning one relative to the other.

4,502,475

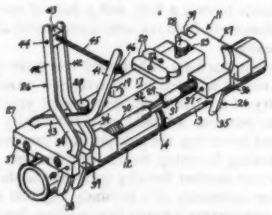
DRILL GUIDE FOR BONE PLATE FIXATION

Robert M. Weigle, Adelphi; Sharon Duggan, Owings; Candace Foster, Clarksville; Jonathan Miner, Bowie; John Vantucci, Catonsville, and Mark Woozley, Frederick, all of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Feb. 22, 1983, Ser. No. 468,776

Int. Cl.³ P61F 5/04

U.S. Cl. 128—92 EB **16 Claims**



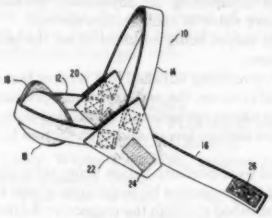
1. A drill guide apparatus for bone plate fixation comprising an elongated drill guide block formed with a bottom recess for receiving and positioning a bone plate of the type having a plurality of spaced screw openings, the guide block having spaced openings arranged to axially align with the bone plate screw openings, respective bone clamping means adjacent the opposite end portions of said guide block, means adjustably securing said bone clamping means to the opposite ends of the guide block, and removable bushing means in at least one of the guide block openings, said bushing means being provided with an axial drill guide bore arranged to align with a subjacent bone plate screw opening.

4,502,476

PROTECTIVE EYE COVER

Claire Doolin Welt, 1137 Schilling Way, Mt. Shasta, Calif. 96067

Filed Aug. 18, 1982, Ser. No. 409,091
Int. Cl.³ A61F *13/00*
U.S. Cl. 128—132 R **11 Claims**



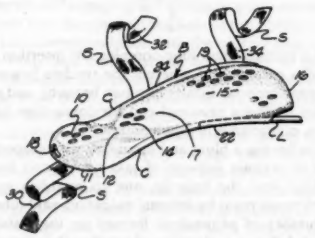
1. A protective eye cover for infants comprising a chin-strapless eye cover assembly, the assembly including:
(a) a first ear piece and a second ear piece;
(b) an eye band with protective eye pads positioned thereon to cover the infant's eyes;
(c) means attaching the eye band to the first ear piece and the second ear piece;
(d) a scalp band;
(e) means attaching the scalp band to the first ear piece and the second ear piece to pass said scalp band over the parietal region of the infant's head;
(f) an occiput band;
(g) means attaching the occiput band to the first ear piece and the second ear piece to pass said occiput band below the infant's occipital protuberance, the occiput band being adjustably attachable and detachable to the second ear piece.

4,502,477

SPLINT FOR USE WITH INTRAVENOUS LINE

Jamie B. Lewis, 28120 S. Ridgeforest Ct., Rancho Palos Verdes, Calif. 90274

Continuation of Ser. No. 308,323, Oct. 5, 1981, Pat. No. 4,425,913. This application Aug. 22, 1983, Ser. No. 525,074
The portion of the term of this patent subsequent to Jan. 17, 2001, has been disclaimed.
Int. Cl.³ A61M *5/00*
U.S. Cl. 128—133 **4 Claims**



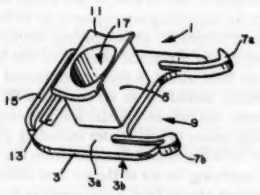
1. A disposable splint for supporting a patient's hand and at least a portion of the forearm to receive an intravenous line, comprising:
a substantially rigid, one-piece molded body adapted to overlie the ventral aspect only of the patient's hand, wrist and forearm, said body defining a dome for mating engagement with only the medial portion of the palm of the hand and a transversely arcuate channel extending away from said dome to receive a portion of the forearm, the dome being disposed to support the hand in a substantially neutral position with regard to the forearm and terminating proximal the phalanges of the hand and having a relatively narrow width and a surface area less than the surface area of the palm so as to permit grasping movement of the thumb and fingers and the transversely arcuate channel being proportioned to permit the insertion of the intravenous line into the veins of the ventral aspect of the wrist; and
fastener means for attaching the splint to the hand and forearm, said fastener means including a first strap disposed to retain the hand against the dome portion, a second strap disposed to retain the wrist against an intermediate portion of the splint, and a third strap disposed to retain the portion of the forearm against the transversely arcuate channel.

4,502,478

MEDICAL INSTRUMENT MOUTH GUARD

Lester J. Lifton, 5270 Strathmore Dr., Mechanicsburg, Pa. 17055

Filed Apr. 4, 1983, Ser. No. 481,978
Int. Cl.³ A61F *5/56*
U.S. Cl. 128—136 **18 Claims**



1. A protective mouth guard comprising:
a main body shield having an inner face adapted for resting generally flush against a patient's face around the mouth;
a projection extending from said inner face so as to extend into a patient's mouth a partial distance beyond the front teeth when in use, and having a shape for maintaining the patient's teeth in spaced apart relationship and further comprising a passageway extending therethrough and through said main body shield for providing passage to a medical instrument from the exterior into the patient's oral cavity while preventing contact between the patient's teeth and the medical instrument when in use; and
said main body shield having, on one side of the projection, an open portion defined by two prongs and large enough to permit entry of an operator's fingers into the patient's oral cavity, when the guard is positioned therein, for facilitating manipulation of an instrument passed through said projection passageway and into the patient's oral cavity, and main body shield further having a cutout portion on the side of the projection opposite the open portion defined by said two prongs.

4,502,479

WATER-ACTIVATED CASTING MATERIAL

Donald C. Garwood, and Shiraz A. Kathiriya, both of Costa Mesa, Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 4, 1979, Ser. No. 72,203
Int. Cl.³ A61F *13/04*
U.S. Cl. 128—90 **8 Claims**

1. An orthopedic casting material comprising a fabric made from a fiber having an initial modulus of elasticity greater than 8×10^6 pounds per square inch, said fabric having a thickness between 0.020 and 0.045 inch and a mesh size of 20 to 200 openings per square inch and a reactive fluid polyisocyanate

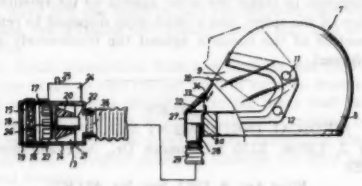
prepolymer resin impregnated in said fabric which hardens when said resin is wetted with water.

4,502,480

HELMET EQUIPPED WITH DEVICE FOR SUPPLYING ATMOSPHERIC AIR

Tamenobu Yamamoto, Higashi-Osaka, Japan, assignor to Yamamoto Kogaku Co., Ltd., Higashi-Osaka, Japan

Filed Feb. 24, 1983, Ser. No. 469,247
Int. Cl.³ A62B 7/04
U.S. Cl. 128—201.15 **8 Claims**



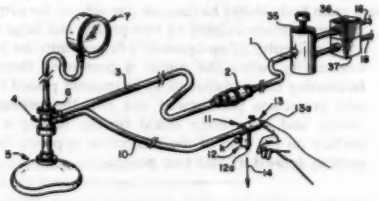
1. A helmet comprising a shell having an opening positionable at the face of a wearer and a protector portion positionable close to the chin of the wearer, a face shield over the opening and a device for supplying atmospheric air to the interior of the helmet, the atmospheric air supplying device having a case incorporated in the protector portion of the helmet, the case having an air feed outlet, a feeder positioned away from the case, the feeder including an air intake, a flexible duct connected between the case and feeder for coupling the case to the feeder feeding means in said feeder including an electric motor and a fan for drawing atmospheric air from the air intake of the feeder and supplying the air to the air feed outlet in the case via said flexible duct, the air feed outlet opening to the inside of the face shield, and air filter means provided at the air intake of the feeder for cleaning the atmospheric air drawn into the air intake.

4,502,481

DEVICE FOR MANUALLY VENTILATING A PATIENT

Pamela H. Christian, 1726 Loree Dr., Dallas, Tex. 75228

Filed Feb. 15, 1983, Ser. No. 466,375
Int. Cl.³ A61M 16/00
U.S. Cl. 128—205.24 **11 Claims**



1. A device for the manual ventillation of a patient, comprising:

a. an inspiratory tube having a bore completely therethrough,

b. said inspiratory tube having means at one end thereof adapted to be connected to a breathing gas source,

c. adaptor means defining first and second flowpaths,

d. said inspiratory tube having its opposite end attached to said adaptor means and communicating with said flow path,

e. a patient connector attached to said adaptor means for receiving breathing gas from one of said paths for inhalation by the patient, and for returning patient exhalation of said breathing gas to said second flowpath,

f. an expiratory tube, having a bore completely therethrough connected at one of its ends to said adaptor means and communicating with said second flowpath to receive said breathing gas when exhaled by the patient,

g. a valve housing having two sections each having an inlet connected to the other end of said expiratory tube and an outlet, and comprising an adjustable, normally closed over-pressure valve in each section thereof,

h. one of said valves being adjusted to set the peak inspiratory pressure,

i. said other valve being adjusted to a weaker bias relative to said one valve to set the end expiratory pressure,

j. each of said valves permitting a controlled flow of breathing gas from said outlets of said each section to the atmosphere,

k. each of said over-pressure valves being separately adjustable so that the respective biasing forces of said two valves may be established to attain the respective desired positive peak inhalation and positive end exhalation pressures in the patient circuit,

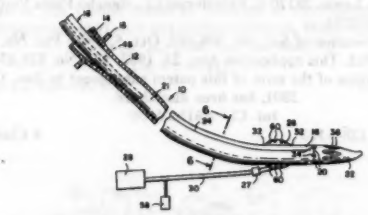
l. said valve said other valve therein comprising an outlet port structured for and subject to being finger occluded, whereby the operator manually, and with a single finger, establishes the duration and frequency of the inhalation and exhalation breathing cycle.

4,502,482

ENDOTRACHEAL TUBE COMPLEX

Victor C. DeLuccia, deceased, late of Yonkers, N.Y.; Nancy DeLuccia, executrix, #116 Edgecliff Ter., Yonkers, N.Y. 10705; Ann Grincell, executrix, #315 W. 55th St., New York, N.Y. 10019, and Henriette Kolodziejcuk, executrix, #1155 Warburton Ave., Yonkers, N.Y. 10701

Continuation-in-part of Ser. No. 496,879, May 23, 1983,. This application Aug. 11, 1983, Ser. No. 522,091
Int. Cl.³ A61M 16/00
U.S. Cl. 128—207.15 **27 Claims**



1. An endotracheal tube complex for insertion into the trachea of a patient, and wherein the trachea branches through the carina tracheae distally into two bronchi, said endotracheal complex having a proximal end for connection to a source of oxygen, comprising in combination

a tube having a blunt and atraumatically shaped distal tip so as to restrain passage of said tip beyond the carina tracheae into the bronchi, and to establish an anatomical reference point by internal palpation, said tube including a plurality of projections formed on the distal tip thereof and defining a plurality of notches therebetween,

an inflatable cuff disposed on said tube adjacent to said tip for closing off the space between the periphery of said tube and the trachea of the patient, thereby preventing any air or air component other than oxygen emanating from said source of oxygen to pass to the bronchi,

a removable introducer disposed in said tube having a bevelled end portion extending from the distal tip of said tube so as to form a smooth atraumatic connection therewith, to facilitate insertion of said tube through the larynx into

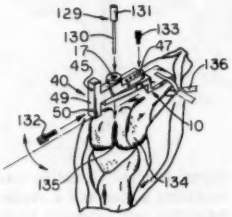
the trachea, said bevelled end portion of said introducer having on its proximal side a plurality of projections substantially mating with said notches at the distal tip of said tube, so as to engage said bevelled end portion to said blunt tip of said endotracheal tube, said introducer including a filament having a length greater than said tube and extending therethrough so that said introducer may be removed from said tube by the withdrawal thereof, and means for releasing the engagement of said bevelled end portion to the distal tip of said tube to permit removal of said introducer from said tube.

4,502,483

METHOD AND APPARATUS FOR SHAPING A DISTAL FEMORAL SURFACE

James A. Lacey, Winter Park, Fla., assignor to Dow Corning Corporation, Midland, Mich.

Filed Mar. 9, 1983, Ser. No. 473,466
Int. Cl.³ A61F 5/04
U.S. Cl. 128—303 R **6 Claims**



1. A method of preparing a human femur having a distal femoral surface containing medial and lateral condyles to receive a distal femoral knee prosthesis, said method comprising the steps of

(A) placing a main body of an alignment guide in contact with the anterior surface of the shaft of said femur, said main body having a resection guide instrument holder cooperatively engaged thereto and fixedly secured to the main body at a preselected angle with respect to the central long axis of said main body, said main body having at least two separate first means for maintaining a fixed relationship with respect to the anterior distal surface of a human femur, said first means being interconnected in such a manner that the central long axis of the main body can be brought to lie over the central long axis of the femur, said main body further containing a second means for cooperatively engaging the resection guide instrument holder such that the central long axis of the holder can be brought into correspondence with the central long axis of the main body and such that the holder can be pivoted about a transverse axis passing through said central long axis of the main body, said transverse axis approximately paralleling the central long axes of the distal lateral and medial condyles of said femur, said second means further being adapted to cooperatively engage a locator pin in such a manner that the central long axis of the locator pin is coaxial with respect to said transverse axis and said resection guide instrument holder being adapted to cooperatively engage said second means such that the central long axis of said holder can be pivoted about said transverse axis relative to the central long axis of the main body, said holder having a third means located thereon for fixing the central long axis of the holder at a preselected angle with respect to the central long axis of the main body and a guide means for cooperatively engaging a distal femoral shaping guide instrument and maintaining it in a fixed relationship with respect to the central long axis of the main body,

(B) passing a locator pin through said second means, said locator pin being adapted to be passed through and cooperatively engaged with said second means such that the central long axis of said locator pin is concentric with said transverse axis, said pin further being of a sufficient length to indicate the proper positioning of said main body on the femur when said pin is caused to rest on and aligned in the center the distal femoral intercondylar notch,

(C) advancing said main body along the anterior surface of the femur until said locator pin contacts the center of the distal femoral intercondylar notch,

(D) rotating said main body on the anterior surface of said femur until the central long axis of said locator pin is perpendicular to a line defined by the posterior surfaces of the medial and lateral distal femoral condyles,

(E) affixing said main body to the anterior surface of the femur,

(F) attaching at least one femoral surface shaping guide instrument to said guide holder, said instrument being adapted to cooperatively engage said guide means and to assume an appropriate fixed relationship with respect to the distal femoral surface and to the central long axis of the femur, said instrument being further designed to aid in shaping the distal femoral surface in such a manner that a preselected femoral knee prosthesis can be attached to said surface, and

(G) modifying the distal femoral surface through the use of said instrument,

(H) repeating steps (F) and (G) as needed until an appropriately shaped distal femoral surface is obtained, using said guide,

(I) removing said main body, holder and any guide instrument engaged therewith from the femur,

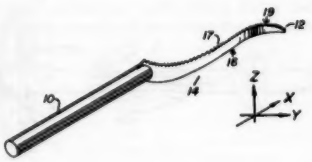
(J) completing any further shaping of the distal femoral surface needed to obtain an appropriately shaped distal femoral surface.

4,502,484

NASAL SURGICAL SAW

Vincent C. Giampapa, 444 Central Park W., New York, N.Y. 10027, and George C. Peck, 1200 Rte. 46, Clifton, N.J. 07013

Filed Jun. 6, 1983, Ser. No. 501,428
Int. Cl.³ A61B 17/14
U.S. Cl. 128—317 **5 Claims**



1. A surgical saw including a shank extension suitable for securement within a reciprocating power handle held and operated within the hand of a surgeon, the surgical saw comprising:

(a) a first end and a second end, said first end integrally depending from said shank extension; and

(b) an elongated, concave, curved, thin blade, said blade having X-, Y-, and Z-axes, said concave curve of said blade beginning at about 60% of the length from the first end thereof on said X-axis and turning into Z-axis and, thereafter, at about 80% of the length from the first end of said blade, said concave curve then also turning into the Y-axis, wherein the three axes of said concave curve of said blade thereby follow the anatomical curve of the nasal-maxillary junction, said blade also defining a plurality of cutting teeth along the entire length of the inferior Z-axis edge of said concave curve, said teeth having their cross-section in the XY plane.

4,502,485

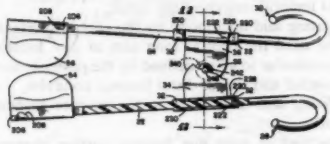
PLASTIC FORCEPS

Kermit H. Burgin, P.O. Box 334, Whitestown, Ind. 46075

Continuation-in-part of Ser. No. 811,550, Jun. 30, 1977, Pat. No. 4,165,746. This application Nov. 8, 1978, Ser. No. 958,795

Int. Cl.³ A61B *17/28*

U.S. Cl. 128—321 7 Claims



1. Disposable forceps including first and second elongated arms, each having a proximal end portion providing a handle and a distal end portion for supporting a contacting member, and a hinge for movable joining the arms to provide adjustment of the forceps, the hinge joining the arms intermediate their ends and including a first portion providing a passageway for receiving an intermediate portion of the first arm, the first portion and first arm being provided with cooperating means for engagement to prevent rotation of the first arm in the first portion in selected rotational orientations of the first arm with respect to the hinge, the first arm being movable longitudinally with respect to the first passageway portion selectively to disengage the engagement means for rotatable adjustment.

4,502,486

DEVICE FOR VETERINARY OBSTETRICAL DELIVERY

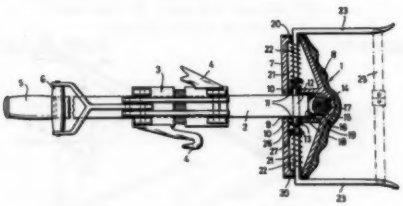
Werner Weiland, Koblenz-Olper-Str. 172, D-5413 Bendorf-Sayn, Fed. Rep. of Germany

Filed Nov. 24, 1982, Ser. No. 444,470

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1981, 3147783

Int. Cl.³ A61B *17/42*

U.S. Cl. 128—353 6 Claims



1. Device for veterinary obstetrical delivery that can be placed against the body of a dam, comprising: a support positioned in relation to the body of the dam; a rod mounted on and connectable to the side of the support facing away from the body; tensioning means mounted on said rod and having hooks for suspending slings for legs of a new-born animal; said support being mounted pivotally in one end of said rod; said rod having means snapping into said support in a position perpendicular to the surface of the support that comes in contact with the body of the dam, said rod being swivelable out of snapped-in position perpendicular to the support after application of the device while maintaining the position of the support for preventing injury to the dam, said support being variably positionable by said rod during delivery of the new-born; said support having lock means facing the corresponding end of said rod and being in form of a sphere displaceable against the force of a spring.

4,502,487

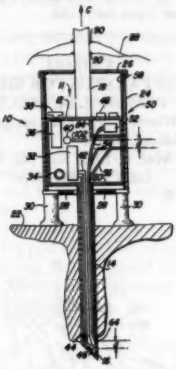
OPTICAL THERMODETECTOR

Denyse C. DuBrucq, 1520 17th St. North, #4, Arlington, Va. 22209, and Henry C. Kondracki, 707 Tamarack Way, Herndon, Va. 22070

Filed Apr. 29, 1983, Ser. No. 490,045

Int. Cl.³ A61B *5/00*

U.S. Cl. 128—665 16 Claims



1. An optical-thermodetector for testing tissue, comprising:

(a) a housing including a case and a needle-like extension projecting therefrom, said extension having a sharp end for piercing the skin of a patient;

(b) a temperature element disposed within said housing and having indicating means responsive to a predetermined change in temperature, said temperature element including sensor means disposed near the end of said needle-like extension; and

(c) an optical element disposed within said housing for recording the coloration of the tissue from an area near said temperature sensor, said optical element comprising:

(i) a light source;

(ii) an incident light path for conducting light from said source to the tissue to be tested;

(iii) a light collector disposed within said case;

(iv) a reflected light path for conducting reflected light from said tissue to said collector and

(v) a film plane, where film for recording tissue coloration is to be located, said film plane being moveable with respect to said light collector, said collector projecting light from said reflected light path onto said film plane.

4,502,488

INJECTION SYSTEM

Bruno Degironimo, Billerica; Neil D. Silverman, Framingham; William R. Oliver, Chelmsford, and Eugene C. Rideout, Billerica, all of Mass., assignors to Allied Corporation, Morristown, N.J.

Filed Jan. 13, 1983, Ser. No. 457,755

Int. Cl.³ A61B *5/02*

U.S. Cl. 128—692 12 Claims

1. An interactive injection system comprising

a catheter of the type adapted for insertion into the vascular system of a patient for thermodilution measurements or the like, said catheter having a proximal end, a distal end, a lumen that extends from said proximal end to said distal end, an external connector at said proximal end, a port adjacent said distal end of said catheter, and a thermal sensor located between said port and said distal end, said sensor providing signals as a function of temperature,

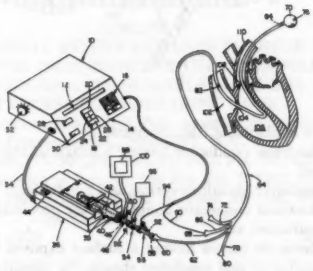
bolus injection apparatus including a chamber for storing liquid injectate, said chamber having an outlet port, means

for connecting said chamber outlet port to said lumen through said external connector, and

drive means including a stepper motor for decreasing the effective volume of said chamber at a predetermined rate to discharge a predetermined quantity of liquid injectate from said chamber for injection through said lumen and discharge as a bolus from said port into the vascular system of the patient, said drive means including pressure responsive means for stalling said stepper motor to interrupt the decrease in volume of said chamber in response to a predetermined resistance to flow of injectate from said chamber, and

controller apparatus including

processor means including a pulse distributor for applying stepping pulses to said motor, means to vary the distribution of said stepping pulses to change the rate at which injectate is discharged from said chamber,



first operator controlled input means for selecting the quantity of injectate to be discharged from said chamber,

second operator controlled input means for applying pulses from said pulse distributor to said stepper motor for actuating said stepper motor to decrease the effective volume of said chamber at a predetermined rate to discharge said predetermined quantity of liquid injectate from said chamber for injection into the vascular system of the patient through said lumen,

means responsive to signals from said sensor for generating output data as a function of sensed changes in response to injection of said liquid bolus through said catheter lumen into said vascular system, and

output means for presenting output data generated by said processor means.

4,502,489

APPARATUS FOR MEASURING AUDITORY REACTION TIME

William W. Alston, Jr., Palo Alto, Calif., assignor to Audostart Corporation, Palo Alto, Calif.

Filed Sep. 29, 1982, Ser. No. 428,325

Int. Cl.³ A61B 5/16

U.S. Cl. 128—746 **10 Claims**

1. Apparatus for measuring an athlete's auditory reaction time, and for training an athlete to reduce his auditory reaction time in response to an auditory stimulus used to initiate an athletic event comprising:

(a) means for actuating the apparatus;

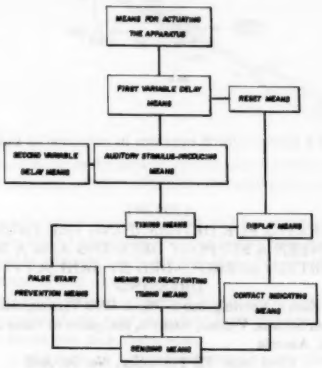
(b) auditory stimulus-producing means capable of simulating an auditory stimulus used to initiate an athletic event;

(c) sensing means capable of detecting a minimum movement made by the athlete;

(d) first variable delay means connected to the means for actuating the apparatus, and responsive to said means for actuating the apparatus, for providing a first variable time period following the actuation of the apparatus; said first variable delay means being further connected to the auditory stimulus-producing means and being capable of causing a first actuation of the auditory stimulus-producing means at the end of said first variable time period;

(e) second variable delay means connected to the auditory stimulus-producing means, and responsive to the auditory stimulus-producing means, for providing a second variable time period following the first actuation of the auditory stimulus-producing means; said second variable delay means being capable of causing a second actuation of the auditory stimulus-producing means at the end of said second variable time period;

(f) timing means connected to the auditory stimulus-producing means, and responsive to said auditory stimulus-producing means and being activated by the onset of the second actuation of the auditory stimulus-producing means;



(g) means for deactivating the timing means connected to the timing means and being further connected to the sensing means and responsive to said sensing means; said means for deactivating the timing means being capable of deactivating said timing means when the athlete makes a minimum movement which is detectable by said sensing means; and,

(h) display means connected to the timing means, said display means being capable of displaying the time measured by said timing means.

4,502,490

PATIENT MONITORING EQUIPMENT, PROBE FOR USE THEREWITH, AND METHOD OF MEASURING ANESTHESIA BASED ON OESOPHAGAL CONTRACTIONS

John M. Evans, Abingdon, and Colin C. Wise, Penarth, both of England, assignors to Antec Systems Limited, England

Filed Oct. 23, 1981, Ser. No. 314,413

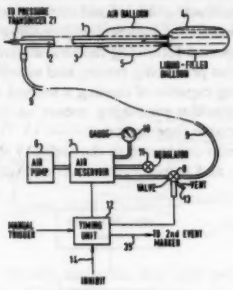
Claims priority, application United Kingdom, Oct. 28, 1980, 8034669; Dec. 11, 1980, 8039741

Int. Cl.³ D61B 5/10

U.S. Cl. 128—780 **49 Claims**

1. Patient monitoring apparatus, comprising a sensor for providing signals indicative of smooth muscle contractions in the oesophagus of a patient, means for deriving from the said

signals an output indicative of the depth of anaesthesia of a patient, and means adapted to connect said output deriving



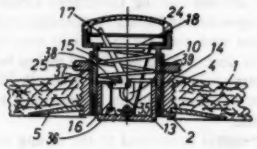
means to a device which operates in response to said derived output.

4,502,491

APPARATUS FOR DETERMINING THE PRESSURE BETWEEN A SUPPORT DRESSING AND A BODY PORTION SURROUNDED BY SAID SUPPORT DRESSING

Hans G. Ender, Ferstelgasse 6/20, A-1090 Vienna, Austria, and Wilhelm Sillaba, Vienna, Austria, assignors to Hans G. Ender, Vienna, Austria

Filed Mar. 22, 1982, Ser. No. 360,465
Int. Cl.³ A61B 5/10
U.S. Cl. 128—782 18 Claims



1. An apparatus for determining the pressure between a support dressing which has been applied to a part of a persons body and that portion of the body surrounded by said support dressing comprising:

tubular socket retaining body means having first and second ends and adapted to extend through said support dressing, said retaining body means including means for immovably anchoring said retaining body means in said support dressing with said first end adjacent the interior of said support dressing;

an internal fastening means in said tubular socket;

removable means for sensing the pressure extending through said retaining body means including a first housing part having an external fastening means thereon removably mounted in said retaining body means in fixed relationship to said support dressing with said internal and external fastening means cooperatively engaged,

at least one separate second part mounted in and movable relative to said first part in response to said pressure, said at least one separate second part extending from said first part beyond said first end of said retaining body means, and

means adapted to urge said at least one movable second part against said body portion;

means for indicating the pressure sensed by said sensing means; and

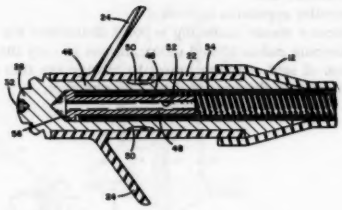
means operatively associated with said at least one movable second part and said indicating means for actuating said indicating means.

4,502,492

LOW-POLARIZATION LOW-THRESHOLD ELECTRODE

Gene A. Bornzin, Coon Rapids, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Apr. 28, 1983, Ser. No. 489,657
Int. Cl.³ A61N 1/04
U.S. Cl. 128—785 7 Claims



1. An implantable lead, comprising:

an electrical conductor having a proximal end and a distal end;

an insulative sheath covering said conductor;

an electrical connector coupled to the proximal end of said conductor; and

an electrode means having a surface exposed through the exterior of said insulative sheath, for directly contacting the endocardium of a human heart at said exposed surface, wherein substantially all of said exposed surface is provided with a coating of platinum black and wherein said electrode means is coupled to the distal end of said conductor.

6. An implantable lead, comprising:

an electrical conductor having a proximal end and a distal end;

an insulative sheath covering said conductor;

an electrical connector coupled to the proximal end of said conductor; and

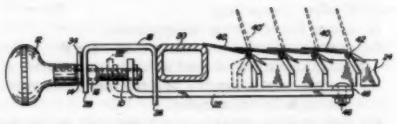
an electrode coupled to the distal end of said conductor and having an exposed surface, said electrode provided with tine means for urging said exposed surface of said electrode in a predetermined direction, said exposed surface of said electrode provided with grooving perpendicular to said predetermined direction.

4,502,493

INFINITE ADJUSTMENT MEANS FOR SIEVE AND CHAFFER SLATS

Dennis J. Jones, West Brooklyn; Earl L. Scheidenhelm, and Thomas G. Truckenbrod, both of Mendota, all of Ill., assignors to Hart-Carter Company, Mendota, Ill.

Filed Dec. 12, 1983, Ser. No. 560,500
Int. Cl.³ A01F 12/30
U.S. Cl. 130—24 5 Claims



1. Means for operating and adjusting the slats of a threshing machine chaffer comprising a screw mounted on said chaffer frame, said screw having an operating knob on its outer end and a knob shank into which said screw is fixed, a mounting

plate attached to the chaffer frame for holding said screw in a position extending lengthwise of the chaffer and having threaded attachment with a bar means having an operating connection with the chaffer slats, said screw extending toward the chaffer frame through an opening formed in said mounting plate and of a size sufficient to only admit passage of said screw, said opening having a lateral passage through which said screw can be released laterally from said opening, lock means on said screw on each side of said mounting plate and spaced apart for only sliding fit along said lateral passage, the one of said lock means adjacent said knob being fixed on said screw and of noncylindrical form, and a latch plate pivotally mounted on said mounting plate normal to and extending beyond said screw and having an opening in its edge shaped to receive and fit the noncylindrical lock means and hold it against rotation.

4,502,494

NORBORNYL ESTERS AND USES THEREOF IN AUGMENTING OR ENHANCING THE ORGANOLEPTIC PROPERTIES OF A CONSUMABLE MATERIAL AND PROCESS FOR PREPARING SAME

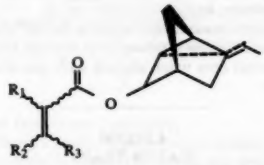
Mark A. Sprecker, Sea Bright, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 507,290, Jun. 23, 1983, Pat. No. 4,480,648, which is a division of Ser. No. 396,288, Jul. 7, 1982, Pat. No. 4,435,516. This application Jan. 26, 1984, Ser. No. 574,183

Int. Cl.³ A24B *3/12, 15/30*

U.S. Cl. 131—276 **8 Claims**

1. A process for augmenting or enhancing the aroma or taste of chewing tobaccos comprising the step of adding to said chewing tobacco an aroma or taste augmenting or enhancing quantity of at least one ester defined according to the structure:



wherein one of the dashed lines represents a carbon-carbon bond and the other of the dashed lines represents no bond; wherein the wavy lines represent a "cis" or a "trans" juxtaposition of the R_1, R_2, R_3 and carboalkoxy moieties around the carbon-carbon double bond; wherein R_1, R_2 and R_3 each represents methyl or hydrogen with the proviso that at least one of R_1, R_2 and R_3 is hydrogen.

4,502,495

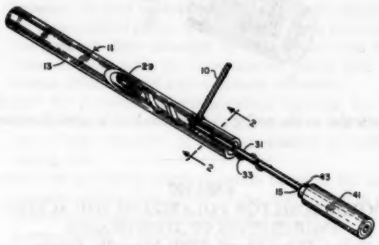
APPARATUS FOR MAKING HELICAL CENTER-CORED SMOKERS' FILTERS AND METHOD

Hans Podszus, 62 Hope Dr., Bella Vista, Ark. 72714

Filed Jan. 16, 1984, Ser. No. 571,201

Int. Cl.³ A24D *3/04;* **A24F** *3/02, 9/00*

U.S. Cl. 131—328 **19 Claims**



1. Apparatus to make helical center-cored smokers' filters from pipe cleaners or other elongated brushlike elements comprising

a thin walled tube having an open end for receiving a pipe cleaner at least approximately two inches long and having an inside diameter not greater than the uncompressed diameter of said cleaners,

a helical guide having a pitch of less than one-half inch on the outside of said tube extending from said open end to at least about one inch therefrom,

a stop in said tube to aid in positioning a pipe cleaner in a predetermined position therein,

a winding element including a hollow cylinder having an inside diameter about twice the outside diameter of said thin walled tube, said cylinder having a notch in a first end thereof shaped to engage a pipe cleaner portion extending out of the open end of said tube bent at an angle thereto,

a pressure finger near said notch positioned to press said pipe cleaner against said tube while it is rotated around said tube along said helical guide, and

an opening in the wall of said cylinder spaced from said open end allowing a wound filter to be held relative to said winding element while said tube and helical guide are rotated to disengage from said filter,

whereby a pipe cleaner may be placed with one end in said tube against said stop, said cleaner may be bent at an angle, said winding element may have said first end placed over said tube engaging said cleaner in said notch and be rotated to wind the free portion of said cleaner about said tube and itself to form a helical center-cored smokers' filter.

4,502,496

HAIR CURLING DEVICE

Cornelia Thomas, and Rachel T. Wingert, both of 3 Halkin Mews, Belgrave Sq., London, England (SW1X 8JZ)

Filed Dec. 21, 1981, Ser. No. 332,657

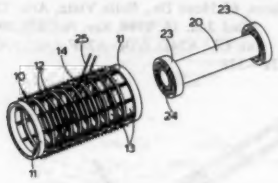
Claims priority, application United Kingdom, Dec. 30, 1980, 8041445

Int. Cl.³ A45D *2/00*

U.S. Cl. 132—40 **6 Claims**

1. A hair setting roller having an outer cage comprising a plurality of longitudinally extending circumferentially spaced strips of material, and a heatable central core fabricated from a heat retaining material wholly received with said cage, said core having end flanges and a reduced diameter portion extending over a major portion of its length, said flanges being sized and positioned to fit within said cage to space said reduced diameter portion from said cage to define an air-circulating space therebetween to permit the circulation of air between

said strips of material and through said space, whereby hairpins can be inserted through said space in a direction substantially



perpendicular to the roller to maintain hair wound thereabout in place.

4,502,497

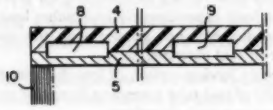
TOOTHBRUSH FOR POLARIZING THE ACTIVE INGREDIENTS OF TOOTHPASTE

Joseph Sinhou, 13 rue Pascal, 13007 Marseille, France

Filed Jan. 28, 1983, Ser. No. 462,051

Int. Cl.³ A45D *44/18*

U.S. Cl. 132—84 R **11 Claims**



1. A toothbrush for increasing the concentration of fluoride ions in predetermined portions of the teeth when fluoride toothpaste is brushed onto the teeth in the mouth, wherein said toothbrush comprises:

(a) a dielectric material;

(b) at least one magnet in contact with said dielectric material;

(c) a conductor in contact with said at least one magnet; and

(d) conductive bristles in contact with said conductor, wherein said dielectric material, said magnet, said conductor and said conductive bristles together comprise a means for rapidly diffusing said fluoride ions in the mouth when fluoride toothpaste is brushed on said teeth by said bristles.

4,502,498

PLASTIC NIT COMB

Albert Saferstein, and Gilbert Spector, both of Rye Brook, N.Y., assignors to Comb Associates, New York, N.Y.

Continuation-in-part of Ser. No. 265,048, May 19, 1981, abandoned. This application Nov. 23, 1982, Ser. No. 444,053

Int. Cl.³ A45D *24/04*

U.S. Cl. 132—137 **11 Claims**

1. A comb comprising: a handle having two main surfaces having a common main edge and a plurality of substantially parallel, spaced apart, elongated teeth extending from the main edge, each tooth comprising both a first and a second section each section including a planar base portion and a convex portion wherein all of the first sections are aligned and all of the second sections are aligned and the planar base portions of the first and second sections are aligned and the planar base portions of the first and second sections of each tooth abut to each other and are offset by a distance less than the distance between adjacent aligned sections, so that the teeth are not symmetrical with respect to the plane which includes the planar base portions.

4,502,499

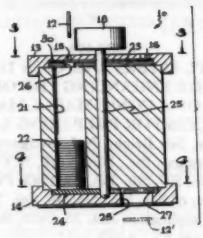
MESSAGE BANK

Iley F. Behr, 10847 Hortense St., #3, North Hollywood, Calif. 91602

Filed Sep. 28, 1982, Ser. No. 425,643

Int. Cl.³ G07D *9/00*

U.S. Cl. 133—6 **4 Claims**



1. A coin storage and dispensing apparatus comprising:

a storage means for holding a quantity of coins in a stack;

rotary dispensing means carried on said storage means operable to select one of said stacked coins for dispensing exteriorly of said storage means;

visual message display means disposed between said storage means and said dispensing means whereby a printed message is presented during operation of said dispensing means;

timing means coupled between said display means and said dispensing means for releasing said selected coin at the conclusion of said printed message presentation;

said storage means is a cylindrical body having an open-ended passageway substantially occupied by said coin stack;

said display means and said dispensing means comprising a pair of discs rotatably carried on and separated by said body;

shaft means interconnecting said discs so as to rotate in unison about opposite ends of said body;

each of said discs having an aperture for sequentially registering alternately with opposite ends of said body passageway for introducing a coin into said passageway or selecting a coin from said stored stack preparatory for dispensing therefrom; and

a base member immediately adjacent to said dispensing disc of said pair having a release hole therein adapted to pass said selected coin when aligned with said dispensing disc aperture.

4,502,500

WATER TRAPS

John Upton, 7 Rowgate, Upper Cumberworth, nr. Huddersfield, West Yorkshire, England

Filed Feb. 14, 1983, Ser. No. 466,105

Int. Cl.³ F16K *9/00*

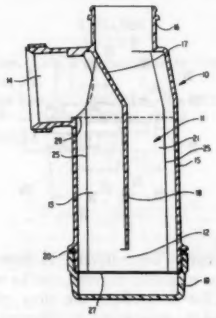
U.S. Cl. 137—247.25 **4 Claims**

1. A water trap comprising:

(a) a body;

(b) a passage defined by said body;

(c) a downwardly extending portion of said passage, which in use communicates with the interior of a building;
(d) a barrier;
(e) a transverse portion of said passage passing under said barrier and leading from said downwardly extending portion;
(f) an outlet to the exterior of the building;
(g) an upwardly extending portion of said passage leading from said transverse portion and communicating with said outlet;



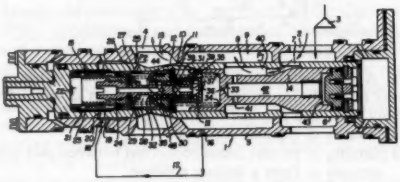
(h) a gas barrier provided by said transverse portion when filled with water;
(i) at least one reservoir chamber which, when said trap is filled with water to the level of said outlet from said upwardly extending portion, contains sufficient water to refill said transverse portion at least to the height of said barrier, should said transverse portion be emptied by siphonage, the reservoir chamber, when viewed in plan, being offset to one side of a notional line joining the inlet and the outlet to provide a compact construction having an efficient anti-siphoning action.

4,502,501

FUEL CONTROL ASSEMBLY INCORPORATING AN INTEGRAL PRESSURE DROP MONITOR FOR USE WITH A GAS TURBINE PLANT

Guy d'Agostino, Vitry; André Dhainaut, Dammarie les Lys, and Claude M. J. Maillard, Vulaines sur Seine, all of France, assignors to S.N.E.C.M.A., Paris, France

Filed Jun. 14, 1983, Ser. No. 504,163
Int. Cl.³ F16K *31/363*; G05D *7/00*
U.S. Cl. 137—487 **5 Claims**



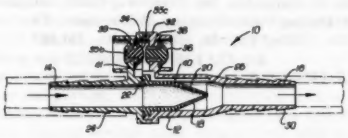
1. In a fuel flow control assembly,
means defining a casing, a flow-control piston with an internal bore, slidable within the casing, and defining with the latter,
an upstream chamber operable at a pressure P_1 and adapted to be connected to a pressurized fuel supply including a pump,
a downstream chamber operable at a pressure P_2 and adapted to be connected to a pressurized fuel consumer installation, and
a variable metering orifice providing communication between the said chambers in dependence upon the relative location of the piston and the casing,
a linearly-displaceable slide control valve slidable within the bore of the piston, a pressure-drop monitor disposed within the bore of the piston and capable of detecting a change in the pressure drop P_1-P_2 across the variable metering orifice.
the slide control valve serving to provide communication between the said upstream and downstream chambers of the flow-control piston in dependence upon any change in the pressure drop detected by the monitor and furthermore defining with the flow control piston both an upstream chamber and a downstream chamber,
means for providing communication between the downstream chamber of the slide control valve and a selected one of the chambers of the flow-control piston and its casing, and
means for providing communication between the upstream chamber of the slide control valve and a point in the fuel flow control circuit determined as a function of the type of pump utilized in providing said pressurized fuel supply.

4,502,502

OVERPRESSURE SAFETY VALVE

John A. Krug, Orange, Calif., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Sep. 22, 1982, Ser. No. 421,027
Int. Cl.³ F16K *17/164*
U.S. Cl. 137—512.3 **5 Claims**



1. An overpressure safety valve assembly comprising:
an elongated tubular body portion having an inlet portion having a first end including means adapted to be connected to a conduit and an opposite second end, and an outlet portion having a first end including means adapted to be connected to a conduit and an opposite second end, said second ends of said tubular body portion being complimentally configured to each other such that when joined together, form a flow path through said tubular body, and a unidirectional flow regulator valve having mounting means adapted to be sandwiched between the second ends of said inlet and outlet portions, said second ends of said inlet and outlet portions of said tubular body portions including means configured to receive said mounting means therebetween, said unidirectional flow valve permitting flow through said tubular body portion only from said inlet portion to said outlet portion;
a separate tubular relief valve portion joined to said tubular body portion in side by side relation thereto, said tubular relief valve portion having an inlet portion including first and second ends and an outlet portion having first and second ends, said inlet portion of said tubular relief valve portion being positioned adjacent said inlet portion of said tubular body portion with the second ends of each portion lying substantially in a common plane, said outlet portion of said tubular relief valve portion being positioned adjacent said outlet portion of said tubular body portion with the second ends of each portion lying substantially in a common plane, said second ends of said tubular relief valve portion being complimentally configured to each other, said inlet and outlet portions of said tubular body portion and tubular relief valve portion being connected together with said unidirectional flow valve such that said second ends of each respective portion are joined together

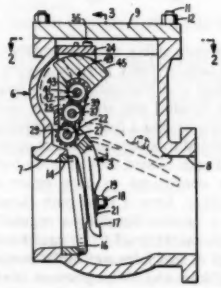
with said flow valve in said flow path and wherein said first and second portions of said tubular relief valve portion forms a chamber, a first relief valve mounted in said inlet portion of said tubular relief valve portion upstream of said chamber and configured to open if the pressure within said overpressure safety valve assembly diminishes below a predetermined level, and a second relief valve mounted in said outlet portion of said tubular relief valve portion downstream of said chamber and configured to open if the pressure adjacent said outlet portion of said overpressure safety valve assembly exceeds a predetermined level, and further wherein said tubular body portion and said tubular relief valve portion defines a flow channel for fluid flow from said outlet portion of said tubular body portion to said chamber.

4,502,503

VACUUM BREAKER VALVE WITH INTERNALLY BALANCED DISC

Anatole N. Karpenko, San Francisco, Calif., assignor to Anchor/Darling Valve Company, Williamsport, Pa.

Filed Feb. 24, 1982, Ser. No. 351,985
Int. Cl.³ F16K *15/03, 17/12*
U.S. Cl. 137—527.8 **1 Claim**



1. A check valve comprising

a valve body having an inlet and an outlet valve seat means in said body being disposed at an angle with respect to vertical so as to be upwardly inclined toward said inlet;

a first shaft rotatably mounted in said body adjacent said valve seat, said shaft having a valve disc fixedly mounted thereon for rotation therewith, said valve disc being located in said valve body to seat on said inclined valve seat to interrupt fluid flow between said inlet and said outlet;

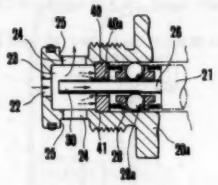
a counterweight fixedly mounted on a second shaft for rotation therewith and located directly above and parallel to said first shaft in such a manner that the weight of the valve disc and the counterweight tend to keep the valve closed when the valve is closed and wherein the counterweight offsets the weight of the valve disc when the valve is open and tends to keep the valve open, and gear means mounted for rotation on said first, second and a third shaft between said first and second shafts for transmitting motion between said first and second shafts.

4,502,504

FLOW QUANTITY CONTROL VALVES

Kunio Okada; Sadao Takeshima, and Shuichirow Tashiro, all of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1981, Ser. No. 312,105
Claims priority, application Japan, Oct. 31, 1980, 55-157082[U]
Int. Cl.³ B62D *5/06*
U.S. Cl. 137—544 **4 Claims**



1. In a flow quantity control valve including a rod-shaped valve made of non-magnetic material, and an orifice formed in a fluid passage for controlling the flow of fluid flowing through said passage, drive means comprising a solenoid coil wound about a cylinder and a plunger disposed within said cylinder and coupled to said rod-shaped valve, said plunger actuated by the solenoid coil for reciprocating said rod-shaped valve into and out of said orifice, the improvement comprising:

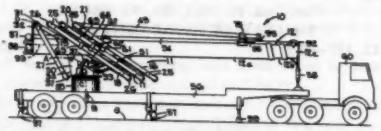
an annular permanent magnet held in position by a shoulder formed on the inner surface of the cylinder wall and a spring disposed between said magnet and said plunger, said magnet being disposed between said orifice and said plunger and encircling said rod-shaped valve and spaced apart therefrom.

4,502,505

TELESCOPING BOOM SUPPORTED CLUSTERED SERVICE LINE

Thomas A. Moller, Brea, Calif., assignor to FMC Corporation, Chicago, Ill.

Filed Sep. 24, 1982, Ser. No. 422,807
Int. Cl.³ F16L *3/00*
U.S. Cl. 137—615 **9 Claims**



1. A boom-supported articulated pipeline for use with a boom assembly for mounting on a transport device having a supply pipe, said pipeline comprising:

a plurality of pipeline sections;

a plurality of pivotal joints connected between said pipeline sections to form a folding pipeline;

means for supportively connecting said boom assembly to said pipeline sections;

first and second inboard pipes;

a first swivel joint connected between a first end of said first inboard pipe and a second end of said second inboard pipe;

a second swivel joint connected between said supply pipe and a first end of said second inboard pipe;

a third swivel joint connected between a second end of said first inboard pipe and an inboard end of said folding pipeline;

means for folding and tilting said pipeline sections into a folded and tilted position to raise said pipeline above said

transport device when said pipeline is adjacent said supply pipe;

means for retaining said pipeline sections in said folded and tilted position as said pipeline sections are moved along said boom assembly; and

means for extending said second end of said first inboard pipe outward from said supply pipe to move said pipeline sections outward from said supply pipe while retaining said pipeline sections in a folded and tilted position.

4,502,506

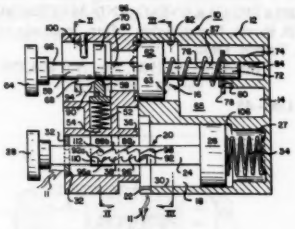
VALVE

Kenneth J. Fisher, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.

Filed Dec. 22, 1982, Ser. No. 452,123

Int. Cl.³ F16K *31/44*

U.S. Cl. 137—624.12 **1 Claim**



1. A valve for sealing an opening in a container after a predetermined number of pressure cycles have occurred outside the container comprising:

a housing adapted to be so mounted to the container as to define a passage through which fluid can flow between the exterior and interior of the container;

a sealing member so mounted to said housing as to be movable relative to said housing, said sealing member being capable of assuming a sealing position in which said sealing member blocks fluid flow through said passage, and at least one opened position in which said sealing member does not block fluid flow through said passage;

a cam member so mounted to said housing as to be exposed to the pressure exerted by the fluid outside the container and to be movable relative to said sealing member, said cam member assuming a first position when the pressure exerted by the fluid outside the container is at the highest value within the range define by the pressure cycle and a second position when the pressure exerted by the fluid outside the container is at the lowest value within the range, movement of said cam member between said first and second positions, caused by the pressure exerted by the fluid outside the container varying between said highest and lowest values, causing said sealing member to assume said opened position if said predetermined number of pressure cycles has not occurred and to assume said sealing position if said predetermined number of pressure cycles has occurred; and

means for permitting said sealing member to be moved manually to an opened position;

said sealing member including means for biasing said sealing member toward said sealing position and a link that engages said cam member, said link being capable of assuming a freed position in which said biasing means can move said sealing member toward said sealing position and a locked position in which said biasing means cannot move said sealing member toward said sealing position, movement of said cam member between said first and second positions causing said link to move between said freed and locked positions.

4,502,507

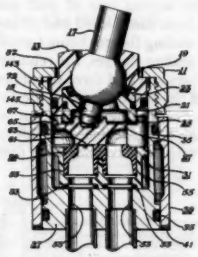
SINGLE HANDLE FAUCET VALVE

Dennis J. Hayman, Plano, Tex., assignor to United States Brass Corporation, Plano, Tex.

Filed Feb. 27, 1984, Ser. No. 583,835

Int. Cl.³ F16K *11/06*

U.S. Cl. 137—625.4 **3 Claims**



1. In a single handle faucet valve, the combination comprising:

a. valve body means defining a chamber having a longitudinal axis,

b. hot and cold water inlets communicating with said chamber,

c. hot and cold water inlet porting seal means having openings communicating with said hot and cold water inlets,

d. a control member with a surface having spaced openings therein movable into and out of registry with said inlet porting seal openings,

e. stem means comprising a lever portion a stem ball and a lower end portion,

f. a retainer member comprising an upper stem ball seat,

g. a stem bearing member comprising a lower stem ball seat and an upwardly facing sealing ring groove,

h. a stem ball sealing ring disposed in said upwardly facing sealing ring groove,

i. means interconnecting the lower end portion of said stem with said control member so that movement of said stem moves said control member,

j. means fixing said retainer member within said valve body chamber with said stem ball captured between said upper and lower stem ball seats,

k. means allowing limited movement of said stem bearing member in the directions of the longitudinal axis of said valve body, so that said stem bearing member will move upwardly responsive to water pressure and its maximum upward movement will be limited by contact of said lower stem ball seat with said stem ball, thus permitting the compression of said sealing ring to vary with magnitude of the water pressure and limiting its maximum compression.

4,502,508

SPOOL VALVE FOR CONNECTING AN OUTPUT TO ONE OF TWO INPUTS

Graham G. Lester, Folkestone, England, assignor to Smiths Industries Public Limited Company, London, England

Filed Mar. 21, 1983, Ser. No. 477,551

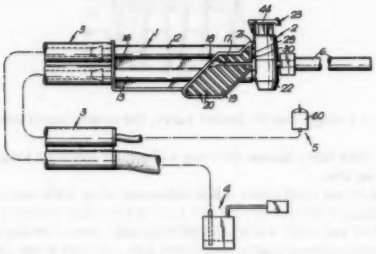
Claims priority, application United Kingdom, Mar. 29, 1982, 8209172

Int. Cl.³ E03B *3/00*

U.S. Cl. 137—625.69 **6 Claims**

1. A valve assembly having a tubular housing, said housing being closed at one end, and said housing having a wall, a first opening in said wall close to and spaced from said closed end, a second opening in said wall spaced from said first opening away from said closed end, one of said first and second openings being adapted for connection to a source of raised pressure and the other of said first and second openings being adapted

for connection to a source of reduced pressure, and a third opening in said wall located intermediate said first and second openings; the valve assembly including a valve member that is displaceable along the tubular housing, said valve member having three sealing flanges which extend outwards of said valve member in spaced relation to one another and in sealing engagement with said wall of said tubular housing, the first one of said sealing flanges being located closest to the closed end of said housing, the second one of said sealing flanges being located furthest from said closed end of said housing, and the third one of said sealing flanges being located intermediate said first and second sealing flanges, the relative disposition of said three sealing flanges and said three openings being such that, in a first position of the valve member, the first flange is located intermediate the first and third openings, with the second and third flanges being both located on a side of the second opening remote from said third opening such that said third opening



is connected to said second opening and is isolated from said first opening, and in a second position of the valve member the first flange is located intermediate said first opening and the closed end of said housing, with the third flange being located intermediate the second and third openings and the second flange being located on the opposite side of said second opening such that said third opening is connected to said first opening and is isolated from said second opening, each of said flanges being of dished shape, said first and third flanges being dished in the same sense and said second flange being dished in the opposite sense such that pressure applied to the valve assembly tends to urge the second flange into closer contact with the wall of the housing at both of said first and second positions of said valve element and tends to urge the first and third flanges into closer contact with the wall of the housing when they lie intermediate said third opening and said first or second openings, respectively.

4,502,509

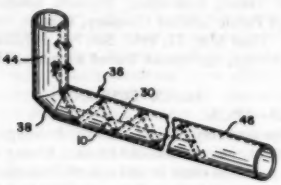
COLLAPSIBLE TURBULATOR

William Spitz, 315 E. 68th St., New York, N.Y. 10021

Continuation of Ser. No. 304,033, Sep. 21, 1981, abandoned. This application Jan. 25, 1984, Ser. No. 573,041

Int. Cl.³ B01F *15/06*; **F15D** *1/02*

U.S. Cl. 138—37 **13 Claims**



1. A collapsible turbulator comprising:

(a) a plurality of substantially rigid turbulator sections, including a leading section, at least one intermediate section and a trailing section;

(b) hinge means for joining together adjacent turbulator sections for relative pivotal movement between a longitudinally extended position wherein the adjacent turbulator sections are substantially coplanar and a contracted, operative position wherein the adjacent turbulator sections are pivoted to be oriented angularly with respect to each other; and

(c) flexible cable means adapted to actuate the turbulator sections from the extended position to the contracted position, the cable means being secured at one end to the leading turbulator section and extending longitudinally of the turbulator, a tensile force applied to the unsecured end of the cable means causing relative pivotal movement between the adjacent turbulator sections.

4,502,510

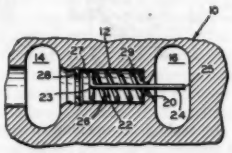
AUTOMATIC CLEANING AND METERING DEVICE

Stephen D. Royle, Bloomington, Minn., assignor to Dana Corporation, Toledo, Ohio

Filed Feb. 9, 1983, Ser. No. 466,276

Int. Cl.³ F15D *1/02*

U.S. Cl. 138—45 **15 Claims**



1. In a fluid system comprising:

(a) a fluid passageway having opposite ends constantly open for flow of fluid therethrough,

(b) a restriction in said passageway, said restriction comprising an orifice and a wire extendable into said orifice, said wire having two axially spaced end portions,

(c) resilient means for axially biasing said wire relative to said orifice, an improvement wherein said wire has a constant diameter throughout, one of said wire end portions is exposed to fluid on one side of said orifice and another of said end portions is exposed to fluid on the other side of said orifice, whereby said wire is axially movable against the force of said resilient means when the pressure force differential applied to the wire by fluid acting on the ends of the wire exceeds the biasing force.

4,502,511

TUBE PLUG

Paolo R. Zafred, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 3, 1983, Ser. No. 455,434

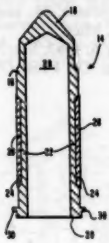
Int. Cl.³ F16L *55/10*

U.S. Cl. 138—89 **1 Claim**

1. A tube plug for preventing flow through tubes in a nuclear steam generator comprising:

a substantially cylindrical Inconel shell having a tapered closed end having a thickness of approximately one-half the thickness of the main portion of said shell where said tapered closed end meets the main portion of said shell and having an open end and defining therein a cavity capable of accommodating a device for expanding said shell into contact with said tube with said shell having a groove on the outside surface of said shell and extending completely around the outside circumference of said shell and having a flange formed on said shell near said open

end for limiting the insertion of said tube plug into said tube; and



an elastomeric room temperature vulcanizing silicone material disposed in said groove for establishing a leak-tight seal between said shell and said tube when said shell is expanded into contact with said tube.

4,502,512

METHOD FOR TREATING A WEFT YARN UPON STOPPAGE OF A SHUTTLELESS LOOM AND DEVICE FOR EFFECTING THE SAME

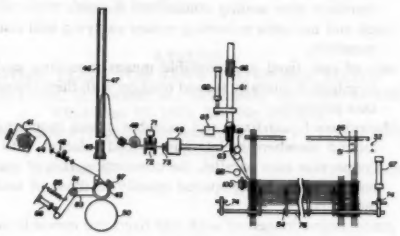
Hajime Suzuki, Anjo, and Yoshimi Iwano, Higashiura; both of Japan, assignors to Seisakusho Kabushiki Kaisha Toyoda Jidoshokki, Kariya, Japan

Filed Jul. 12, 1983, Ser. No. 512,913

Claims priority, application Japan, Jul. 21, 1982, 57-125843; Jul. 21, 1982, 57-125844; Jul. 23, 1982, 57-127732; Jul. 24, 1982, 57-128332

Int. Cl.³ D03D *47/30*

U.S. Cl. 139—116 **23 Claims**



1. A method for treating a weft yarn in a cloth upon stoppage of a shuttleless loom comprising:

stopping said shuttleless loom based on a stop signal;

bringing the warp yarns in an open shed condition between the time of switching off said shuttleless loom and the time of restarting said shuttleless loom, so that a weft yarn which has been picked just before the stoppage of said shuttleless loom is released from its crossed condition between said warp yarns;

automatically inserting a pushing out device into a clearance between said weft yarn and the preceding weft yarn to separate said weft yarn from the cloth; and

removing said separated weft yarn.

4,502,513

STRAP FABRIC AND METHOD OF AND MACHINE FOR MANUFACTURING THE STRAP FABRIC

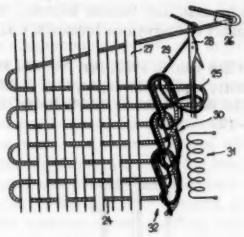
Jakob Müeller, Stansstad, Switzerland, assignor to Textilma, AG, Hergiswil, Switzerland

Continuation of Ser. No. 157,644, Jun. 6, 1980, abandoned. This application Aug. 18, 1983, Ser. No. 524,462

Claims priority, application Switzerland, Jun. 19, 1979, 5716/79

Int. Cl.³ D03D *5/00*

U.S. Cl. 139—383 R **7 Claims**



1. A strap-like fabric comprising a warp, a weft, an additional binding yarn and a knitted selvage formed of end loops of the weft and of loops of the additional binding yarn knitted in said end loops of the weft, said additional binding yarn being located in said end loops of the weft outside of the woven texture of the fabric, said loops of the additional binding yarn having crossing points and being firmly connected one to another at said crossing points by welding to form a plurality of firm points in said selvage, said additional binding yarn including a plurality of components at least one of which is of a thermoplastic material the melting point of which is lower than that of the weft yarn so as to weld together the thermoplastic material at said crossing points into said firm points.

4,502,514

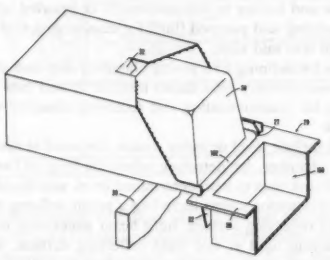
TONER CARTRIDGE AND METHOD OF REPLENISHING TONER TO A XEROGRAPHIC DEVICE

Philip D. Ballard; Cheryl A. Goin; Paul J. Josephson; Andrew D. Keller; Larry W. Lykins, all of Longmont, and Jeffrey J. Miller, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 18, 1983, Ser. No. 514,996

Int. Cl.³ B65B *1/04*

U.S. Cl. 141—1 **10 Claims**



1. A method of replenishing xerographic toner to a xerographic reproduction device, comprising:

providing a toner cartridge which contains a supply of xerographic toner and is packaged in an overpack, one end of which is openable in a manner to expose said cartridge;

opening said one end, leaving a mounting-tab which facili-

tate mounting of said overpack on the reproduction device with said cartridge in position to be moved out of said one end of the overpack onto said replenisher;

mounting said overpack on said reproduction device by inserting said mounting-tab into a tab receiver which is adjacent the replenisher of said reproduction device; and

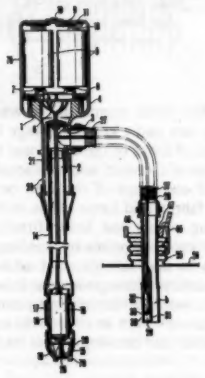
moving said cartridge out of said overpack onto the replenisher of said reproduction device.

4,502,515

DRY BATTERY DRIVEN LIQUID PUMP

Nobushige Kobayashi, and Satoshi Kazama, both of Nagano, Japan, assignors to Maruyama Industrial Co., Ltd., Koshoku, Japan

Filed Feb. 8, 1983, Ser. No. 464,865
Claims priority, application Japan, Oct. 4, 1982, 57-174268
Int. Cl.³ B65B *1/04, 3/10*; F04B *49/00, 35/04*
U.S. Cl. 141—195 **8 Claims**



1. A battery driven liquid pump for pumping liquid into a tank, comprising:

a pump frame;

battery means for supplying power, said battery means disposed in said pump frame;

a suction tube journaled to said pump frame, said suction tube adapted to be immersed into a fluid to be pumped;

fluid pumping means, disposed in said suction tube, for pumping said fluid into said suction tube;

delivery tube means, in communication with said suction tube and having an end adapted to be inserted into a tank receiving said pumped fluid, for discharging said pumped fluid into said tank;

means for defining a receiving chamber, disposed at the end of said delivery tube means inserted in said tank;

means for communicating said receiving chamber with said tank;

liquid surface level detector means, disposed in said receiving chamber, for detecting when the level of the fluid in said tank rises to a predetermined level, said liquid surface level detector means including a prism defining a conical light reflecting surface, light beam generating means for directing light at said light reflecting surface, and light beam receiving means for providing an output signal in response to light reflected by said light reflecting surface, the reflectance of said light reflecting surface substantially decreasing when said fluid in said tank rises to contact said prism; and

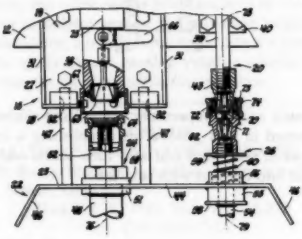
control means, connected to receive said power, for applying said power to said fluid pumping means in response to said output signal.

4,502,516

VENTED FUEL TANK FILLER

William A. Shields, Riverside, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed May 6, 1983, Ser. No. 492,181
Int. Cl.³ F16L *37/00*
U.S. Cl. 141—290 **3 Claims**



1. A positively vented nonspill tank filler for liquid fuels, said filler including

fill and vent couplings connectible with associated fuel storage and supply means, said couplings each having first and second members connectible with one another to define sealed connecting fluid passages, the members of each said coupling having coincident connection axes along with relative movement is required to connect and disconnect said members,

said fill coupling having passage closing valve means in each of its members, said valve means being interlocked to prevent the opening thereof prior to advancing their respective members to a final position of sealing connection,

said vent coupling having passage closing valve means in each of its members, said vent coupling valves being opened by inward telescoping movement of their coupling members after sealing connection thereof,

fixed and movable mounting means carrying said coupling members,

one of said fixed and movable means mounting said first members in laterally spaced relation with their connection axes parallel,

the other of said fixed and movable means mounting said second members in laterally spaced relation with their connection axes parallel, the connection axes of said second members being spaced equally to those of said first members,

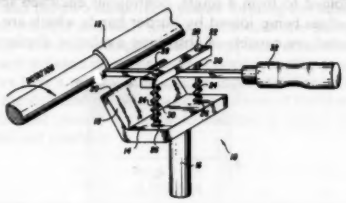
guide means connected with said fixed and movable mounting means and effective to require alignment of the axes of the fill and vent coupling members respectively prior to connection of said members,

said mounting means axially positioning the vent coupling members more closely on their respective axes when aligned than the fill coupling members, such that sealing connection of said fill coupling members and opening of the valves therein requires the prior sealing connection of said vent coupling members and further axial movement thereof to a valve opened position permitting fluid flow through the vent coupling passage, and that a reverse valve closing and detaching movement of the vent coupling members requires the prior closing of the fill coupling valves and detachment and axial withdrawal of the fill coupling members.

4,502,517
SAFETY TOOL REST

Robert W. Larson, 205 Dartmouth St., Warren, Pa. 16365

Filed Apr. 15, 1983, Ser. No. 485,588
Int. Cl.³ B27C 7/06
U.S. Cl. 142—49 4 Claims



1. A safety tool rest for a lathe having a rotating workpiece comprising:

a generally planar base disposed in a horizontal plane;

connecting means attached to said base for connecting said base to the lathe;

an elongate flange projecting outwardly and upwardly from said base, said flange having an upper edge which is disposed adjacent the rotating workpiece and on which a tool engaging the workpiece rests, said upper edge of the flange having a length substantially greater than the width of the tool whereby the tool may be moved along the length of the flange;

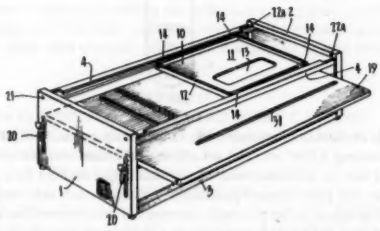
an elongate bar;

attaching means for attaching said elongate bar to said base, said attaching means including means for supporting said bar such that said bar is disposed substantially parallel to said upper edge at a location above said base and at a height higher than said upper edge of the flange, the elongate bar having a length substantially greater than the width of the tool whereby the tool is freely inserted below said bar and extends out over said upper edge of the flange for cutting the workpiece, said bar preventing the tool from being flipped about said upper edge during contact with the rotating workpiece by engagement between the bar and tool at a point along the length of the tool displaced from the point of engagement between the tool and the upper edge of the flange.

4,502,518
WORK TABLE FOR SAWS AND OTHER TOOLS

George Lewin, 21 Norman St., McKinnon, Vic. 3204, Australia

Filed May 17, 1983, Ser. No. 495,402
Claims priority, application Australia, May 20, 1982, PF4085
Int. Cl.³ B27B 5/18
U.S. Cl. 144—286 A 10 Claims



1. A work table for a saw or the like power tool comprising a saw supporting assembly including a saw support member, first runner means for supporting said saw support member and second runner means for supporting said saw support member, said first and second runner means cooperating to support said saw support member in a horizontal plane;

horizontal guide means including a pair of parallel spaced apart horizontally extending guide members for engageably receivingly supporting said first and second runner means for movement in a horizontal plane, whereby said saw support member is movable in a horizontal plane, said horizontal guide means including aperture means for passage of said first or second runner means therethrough to engage or disengage said first or second runner means with said pair of horizontally extending guide members

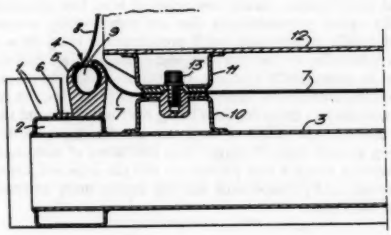
a work support plate locatable either below the saw support member for operation in a docking saw mode or above the saw support member for operation in a bench saw mode,

whereby said saw support member may be inverted from a first position, wherein the blade of a saw mounted on said saw support member projects downwardly for use in the docking saw mode, to a second position, wherein the saw blade projects upwardly for use in the bench saw mode, by disengaging one of said first or second runner means from said pair of horizontally extending guide members through said aperture means, rotating said saw support member in a vertical plane while retaining the other one of said first or second runner means in engagement with said pair or horizontally extending guide members and then reengaging said one of said first or second runner means with said pair of horizontally extending guide members through said aperture means.

4,502,519
CONTAINERS

Harold J. Clements, Canterbury, England, assignor to Modern Precision Engineers and Associates Limited, Kent, England

Filed Mar. 25, 1983, Ser. No. 478,778
Claims priority, application United Kingdom, Mar. 26, 1982, 8208932
Int. Cl.³ B65D 53/00
U.S. Cl. 150—55 8 Claims



1. A transportable container for the storage and transportation of goods in a hermetically sealed environment, comprising a base member and a cover member both of flexible air-impermeable sheet material, and a load-bearing structure underlying said base member and provided with at least one substantially continuous channel to receive and air-tightly interconnect the edges of said base and cover members, said base member being clamped between a base part of the said load-bearing structure and a load-bearing platform carried by said base part and located within the enclosure defined by the base and cover members.

4,502,520

PNEUMATIC TIRE HAVING AIR RETENTION INNERLINER

Paul H. Sandstro n, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 2, 1984, Ser. No. 595,860
Int. Cl.³ B60C *9/00, 5/14*
U.S. Cl. 152—330 R **5 Claims**

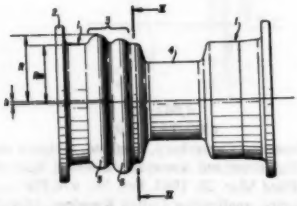
1. A pneumatic rubber tire having an integral innerliner comprising a compounded rubber composition comprised of a sulfur cured blend of about 50 to about 98 phr of at least one halobutyl rubber selected from chlorobutyl rubber and bromobutyl rubber and about 50 to about 2 phr of at least one unsaturated copolymer of propylene oxide and about 0.5 to about 20 weight percent based on the propylene oxide of at least one copolymerizable monomer selected from butadiene monoxide, isoprene monoxide, 1,2-epoxy-3-allyloxypropane (allyl glycidyl ether) and limonene monoxide.

4,502,521

MOUNTING-RIM FOR TIRES AND ITS ASSEMBLY WITH CORRESPONDING TIRE

Giuseppe Tavazza, Milan, and Maurizio Boiocchi, Segrate, both of Italy, assignors to Societa Pneumatici Pirelli S.p.A., Milan, Italy

Filed Mar. 30, 1983, Ser. No. 480,329
Claims priority, application Italy, Mar. 31, 1982, 20495A-82
Int. Cl.³ B60B *25/12*
U.S. Cl. 152—381.4 **9 Claims**



1. A rim for a pneumatic tire, comprising a pair of bead seats each one connected at its axially outer extremity to a radially outwardly extending flange, at least one of said bead seats being also connected, at its axially inner extremity, to a protuberance means which projects radially outwardly, wherein said protuberance means comprises at least two circumferentially raised protuberances that are substantially continuous and axially side-by-side, each protuberance lying on a plane perpendicular to the rim axis and presenting a cross-section that is substantially circular, the center of said cross-section being eccentric with respect to the axis of said rim, the centers of said distinct cross-sections being distributed around the axis of said rim, the radius of each said circular cross-section not being greater than 2% larger than the radius of said bead seat, measured along a line parallel to the rim axis and extending between said protuberance and the axially inner extremity of said bead seat.

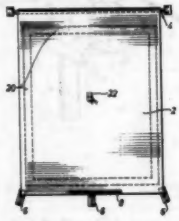
4,502,522

HEAT-INSULATING ROLLER-BLIND

Sven A. J. Liljendahl, Gyllenstiernas vag 8, D-175 76 Jarfalla, Sweden

PCT No. PCT/SE81/00364, § 371 Date Aug. 9, 1982, § 102(e) Date Aug. 9, 1982, PCT Pub. No. WO82/02070, PCT Pub. Date Jun. 24, 1982
PCT Filed Dec. 8, 1981, Ser. No. 413,372
Claims priority, application Sweden, Dec. 8, 1980, 8008599
Int. Cl.³ E06B *9/08*
U.S. Cl. 160—121 R **23 Claims**

15. A heat-insulating roller-blind intended to be placed in front of windows, comprising two thin, transparent, hermetic, congruent sheets defining a space, and a valve located at a bottom of the blind for admission to said space of air and outflow of air when the blind is rolled up to reduce said space, characterized in that the sheets consist of a stiff, but flexible material, and in that the sheets in their outer edges are hermetically joined to from a single, continuous enclosed space, said outer edges being joined by border bands which are soft and elastic and are capable of absorbing a relative displacement of



the sheets when the blind is rolled up on a curtain rod, said border bands having such a width that they can absorb the expansion between the sheets when air is admitted into said space, said valve being openable and closeable to enable, in its open position, admission to said space of the air when manually separating the sheets, thus obtaining a non-circulating, heat-insulating layer of air between the sheets upon closure of the valve.

4,502,523

SLATTED BLIND ASSEMBLIES HAVING AUTOMATIC OPENING AND CLOSING FEATURES

Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas Inc., Totowa, N.J.

Continuation-in-part of Ser. No. 387,035, Jun. 10, 1982, Pat. No. 4,458,740, which is a continuation-in-part of Ser. No. 333,809, Dec. 21, 1981, abandoned. This application Dec. 9, 1983, Ser. No. 559,770
Int. Cl.³ E06B *9/26*
U.S. Cl. 160—174 **8 Claims**

1. A slatted blind assembly comprising a mat of tiltable slats including a first end slat on a first end of the mat and a second end slat on a second end of the mat opposite said first end, at least one pivot means positioned adjacent each said end of the mat adapted to be pivotally connected with respect to a structure and adapted to pivot about a pivot axis extending parallel to the slats and slat support means comprising pairs of cables connected to said pivot means, the cables of each pair running parallel on opposite sides of the slats in a plane perpendicular to the plane of the mat of slats, and each said pair supporting said slats from two supporting points on each said pivot means,

said pairs of cables extending between the pivot means situated at opposite ends of the mat whereby pivotal movement of a pivot means about a pivot axis will cause each of the slats to tilt; whereby, with each pivot means, the two supporting points and a center point of the pivot axis form the vertices of a triangle with the center point forming the top vertex of the triangle and the two supporting points forming the base vertices of the triangle and with the top vertices of the triangles of the two pivot means being situated at opposite ends of the mat of slats and pointed in opposite directions whereby tension in the cables is at a minimum in one or more stabilized tilt positions of the slats and in any other tilt positions of the slats there is an increased tension in the cables tending to return the slats to a stabilized position.

4,502,524

PROCESS AND APPARATUS FOR THE PRODUCTION OF A METALLIC LAMINAR COMPOSITE MATERIAL

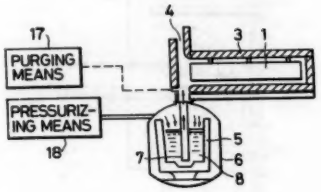
Yoshiyuki Iwanami; Kozo Taniguchi; Mitsunori Funazaki, and Tomoo Takenouchi, all of Hokkaido, Japan, assignors to The Japan Steel Works, Ltd., Tokyo, Japan

Filed Nov. 29, 1982, Ser. No. 444,907

Claims priority, application Japan, May 28, 1982, 57-89764

Int. Cl.³ B22D *21/02, 19/00, 23/00*

U.S. Cl. 164—66.1 **1 Claim**



1. A process for producing a metallic laminar composite material, comprising the steps of:

placing a metallic plate (1) in a pressure-casting mold (3) having a small riser (4) and having an alumina-based coating on its interior surface, and said plate being free of any oxidation-preventing coating;

purging the interior of said mold with an inert gas; and

applying pressure to a pressure tank (6) having a ladle (5) containing a molten metal (8), said ladle having a dip tube (7) for transferring said molten metal to said interior of said mold, whereby the molten metal is cast under pressure around the metallic plate to produce a metallic laminar composite material; wherein said molten metal is different in composition than said metal plate; and wherein said mold is constructed of movable graphite segments; and comprising the further step of varying the size of said interior of said mold between castings by adjusting the relative positions of said segments; and further comprising coating the interface of separate metallic plates and bonding said separate metallic plates together to form said metallic plate which is placed in said mold.

4,502,525

PATTERNS FOR A COUPLER YOKE CASTING

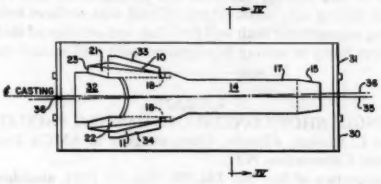
Frank W. Oshinsky, McKeesport, Pa., assignor to McConway & Torley Corporation, Pittsburgh, Pa.

Filed Apr. 19, 1979, Ser. No. 31,643

Int. Cl.³ B22C *7/04*

U.S. Cl. 164—241 **12 Claims**

1. A drag pattern assembly to mold sand in a drag mold for cooperative use with a cope mold for casting a coupler yoke for a railway vehicle wherein the coupler yoke includes a rear end portion having a rear draft gear seat at a generally right angle relation with each inside wall of top and bottom straps extending in a generally parallel and spaced-apart relation at either side of one longitudinal center plane of the coupler yoke from said rear end portion to a front end portion, said front end portion having front follower block seats facing toward said rear draft seat, a draft gear pocket being defined within the area surrounded by the rear draft gear seat, the front follower seats and the top and bottom straps, each of said straps having a midportion with opposed side edges each uniformly spaced from a second longitudinal center plane perpendicular to said one longitudinal center plane, said drag mold pattern assembly including a pattern plate having a generally planar face surface area defining a drag mold pattern parting line, a drag pattern



defined with a longitudinal center plane oblique to said drag mold pattern parting line, said drag pattern including elongated yoke strap side edge sand molding surfaces with the lengths of each surface uniformly spaced from said longitudinal center plane, said drag pattern further including spaced-apart yoke strap inside wall sand molding surfaces generally perpendicular to a rear draft gear seat sand molding surface with the latter being generally perpendicular to said longitudinal center plane, and fastening means to mount said drag pattern onto said pattern plate with the longitudinal center plane of the drag pattern extending obliquely to the planar face surface area of said pattern plate.

4,502,526

SEAL FOR A CONTINUOUS STEEL CASTER

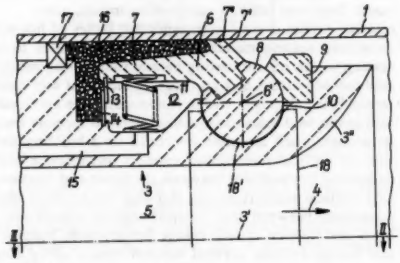
Gerd Artz, Ratingen; Dieter Figge; Thomas Hoster, both of Essen, and Clemens Philipp, Meerbusch, all of Fed. Rep. of Germany, assignors to FRIED. KRUPP Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Jul. 20, 1983, Ser. No. 515,639

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1982, 3231321

Int. Cl.³ B22D *11/06, 11/10*

U.S. Cl. 164—415 **11 Claims**



1. In a continuous steel casting apparatus including a casting nozzle having a longitudinal axis being parallel to a casting direction and an opening oriented in the casting direction; a mold surrounding the casting nozzle and extending therebeyond; said mold having moving mold walls formed of oppositely located, parallel-extending endless first and second casting belts having a width measured transversely to said casting direction; and oppositely located, parallel-extending endless first and second lateral dams; said casting belts and said dams

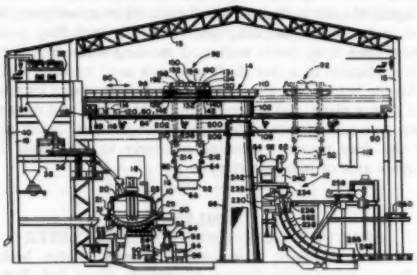
together defining a rectangular casting cross section; the improvement comprising a sealing assembly providing a seal between the casting nozzle and the mold walls; said sealing assembly including at least one sealing lever situated between said casting nozzle and said first casting belt and at least one sealing lever situated between said casting nozzle and said second casting belt; means for movably mounting each said sealing lever on said casting nozzle; each said sealing lever having a sealing face oriented towards a respective said casting belt and extending parallel to the width thereof; and resilient means for resiliently urging each said sealing lever towards the respective said casting belt for maintaining a sealing engagement of said sealing face with the casting belts; said sealing levers having side surfaces; one of said side surfaces being in sealing engagement with said first dam and another of said side surfaces being in sealing engagement with said second dam.

4,502,527

SINGLE SHOP CONTINUOUS CASTING FACILITY

Bruce L. Brewer, Alliance, Ohio, assignor to AMCA International Corporation, N.H.

Continuation of Ser. No. 234,704, Feb. 17, 1981, abandoned.
This application May 2, 1983, Ser. No. 490,465
Int. Cl.³ B22D *11/00*
U.S. Cl. 164—418 **13 Claims**



1. A single shop continuous casting facility comprising

furnace means for producing hot metal, said furnace means including seating means for positioning ladles for receiving hot metal from said furnace means,

continuous casting means for forming solidified metal, said casting means including seating means for positioning ladles containing hot metal to permit the transfer of hot metal from said ladle to said casting means, and

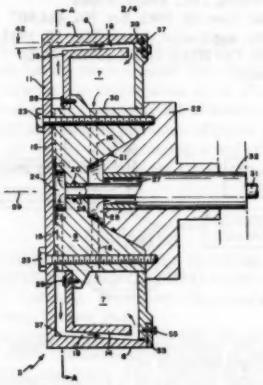
a rotating bridge crane for transporting ladles of hot metal from said seating means of said furnace means to said seating means of said casting means, said seating means of said furnace means and said seating means of said casting means being disposed within the arcuate area serviced by said crane, said crane comprising: vertical support means; an arcuate track mounted overhead on a building structure or vertically elongated support members; a bridge extending horizontally between an upper end portion of said vertical support means and said track; pivot means connected between said vertical support means and an inner end portion of said bridge for rotatably supporting said bridge on said vertical support means; drive means connected with an outer end portion of said bridge for engaging said track and causing said bridge to rotate in a horizontal plane about said vertical support means as said outer end portion of said bridge moves on said track; hoisting means mounted on said bridge, said hoisting means including first and second lifting barrels, first drive means for rotating said first lifting barrel, second drive means for rotating said second lifting barrel, a first gear connected to said first barrel, said first gear being driven by said first drive means in a first direction, a second gear connected to said second barrel, said second gear being driven by said second drive means in a second direction, said first and second gears being disposed with the teeth of one fitting between the teeth of the other and being free of load transmitting contact with each other during normal operation of said first and second drive mean, one of said gears driving the other of said gears upon failure of one of said first or said second drive means; and a pair of ladle hooks suspended from said hoisting means, said ladle hooks being adapted for attachment to the trunnions of a hot metal transfer ladle.

4,502,528

CHILLED CASTING WHEEL

Anthony P. Frissora, Mendham Township, Morris County, and Alexander T. Kojak, Succasuna, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Apr. 4, 1983, Ser. No. 481,555
Int. Cl.³ B22D *11/06*
U.S. Cl. 164—463 **11 Claims**



1. A rotatable casting wheel having an outer peripheral quench surface and an interior, annular coolant chamber, comprising

(a) a wheel hub having a concentric axis of rotation;

(b) two spaced-apart, annular, radially extending side members connected to said hub and located concentric therewith to delimit the side walls of said wheel and said coolant chamber;

(c) a cylindrical, axially extending wheel rim member connected between the peripheral, circumferential edges of said side members to provide said wheel quench surface and delimit the peripheral, circumferential wall of said coolant chamber, said rim having a frusta-conical inner surface that is sloped radially outward along the direction of coolant flow;

(d) a flow director located within said coolant chamber and comprised of at least one annular, radially extending support portion and an axially extending flange portion connected to said support portion; said flange portion being spaced radially inward from and substantially parallel to said rim inner surface to delimit a sloped coolant flow gap therebetween which is substantially continuous, both circumferentially and axially; and

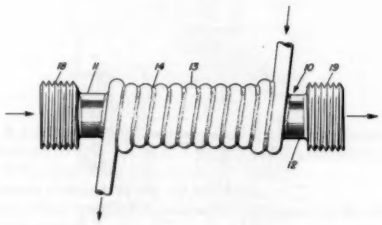
(e) coolant means connected to said wheel hub and in communication with said coolant chamber for passing a coolant through said coolant flow gap while said wheel is rotating.

9. A method for continuously casting a metallic filament on a casting wheel, comprising the steps of:

(a) rotating a casting wheel about a concentric axis of rotation, said wheel having an interior coolant chamber and a

wheel rim member that provides an outer peripheral quench surface;
(b) directing coolant toward an inner surface of said wheel rim;
(c) passing coolant through a flow gap region, located between said rim inner surface and an axially extending flow director spaced radially inward therefrom, to cool said quench surface, said flow gap region being substantially continuous, both circumferentially and axially, and adjacent to said wheel rim inner surface;
(d) sloping said flow gap region radially outward along the direction of coolant flow to minimize the formation of gas bubbles along said rim member; and
(e) depositing a stream of molten metal onto said quench surface to cast said filament.

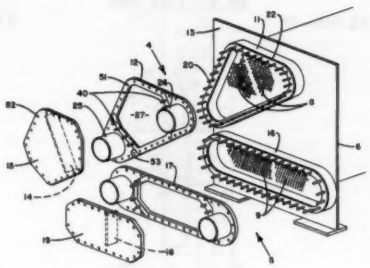
4,502,529
HEAT RECOVERY SYSTEM
Paul R. Varney, Jackson Lane, Barre, Mass. 01005
Filed Sep. 30, 1981, Ser. No. 307,299
Int. Cl.³ F24H *3/00*
U.S. Cl. 165—47 **3 Claims**



1. Heat recovery system, comprising:
(a) an entrance pipe fitting for receiving a flowable heat-containing waste substance, said entrance pipe fitting having an entrance opening and an exit opening,
(b) an exit pipe fitting for emitting the waste substance, said exit pipe fitting having an exit opening and an entrance opening spaced from the exit opening of said entrance pipe fitting, and
(c) a coil of cylindrical tubing for conducting cold water on its way to a conventional water heater, the turns of the coil tubing being helically arranged and in sealing contact to form a conduit tube, one end of said coil being sealably connected to the exit opening of said entrance pipe fitting and the other end of said coil being sealably connected to the entrance opening of said exit pipe fitting, said conduit tube having an inner surface which defines a connecting passageway for conducting said waste substance from said entrance pipe fitting to said exit pipe fitting and isolated from said passageway, said inner surface having a helical groove generated about the longitudinal axis of the conduit so as to define a helical convex ridge between helical turns of said groove.

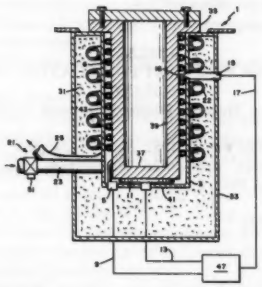
4,502,530
WATERBOX FOR A SHELL AND TUBE HEAT EXCHANGER
Edward A. Huenniger, Liverpool, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.
Filed Sep. 23, 1982, Ser. No. 421,745
Int. Cl.³ F28F *9/06*
U.S. Cl. 165—72 **4 Claims**

1. A waterbox for a shell and tube heat exchanger having a tube sheet at one end of the heat exchanger for supporting heat exchange tubes which extend through the tube sheet, said waterbox comprising:
a wall member attached to the tube sheet to surround a selected area on the tube sheet which includes the area through which the heat exchange tubes extend;
a top member attached to the wall member to form an enclosure at the end of the heat exchanger, said top member having an access opening which projects onto the area on the tube sheet through which the heat exchange tubes extend;



a nozzle means located in the top member for forming an opening in the top member which projects onto an area on the tube sheet through which no heat exchange tubes extend; and
a removable cover over the access opening in the top member.

4,502,531
HIGH-PRESSURE VESSEL FURNACE
Peter Petersen, Murray Hill, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.
Filed Feb. 28, 1983, Ser. No. 470,739
Int. Cl.³ F28F *7/00*
U.S. Cl. 165—76 **12 Claims**

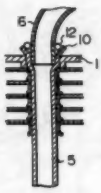


1. A furnace for heating a vessel having a vessel bottom and at least one vessel side wall, comprising:
(a) a furnace housing which is adapted to contain said vessel and has a housing bottom and at least one housing side wall;
(b) bottom heating means located at said housing bottom for contacting and heating said vessel bottom;
(c) side wall heating means located at said housing sidewall for contacting and heating said vessel sidewall said sidewall heating means constructed to provide a resilient, sliding interference fit directly against said vessel when the vessel is placed in said furnace;
(d) thermal insulating means disposed about said housing for reducing heat loss therefrom.

4,502,532
FIN-AND-TUBE TYPE HEAT EXCHANGER

Ryozo Tomozaki; Takeshi Uchita, both of Mito; Hideo Ide, Katsuta, and Misao Suzuki, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 352,798, Feb. 26, 1982, abandoned.
This application Mar. 27, 1984, Ser. No. 593,963
Claims priority, application Japan, Mar. 4, 1981, 56-29902
Int. Cl.³ F28F 9/26
U.S. Cl. 165—79 3 Claims

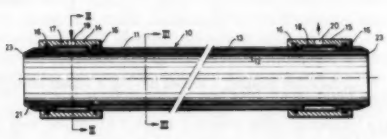


1. A joint construction of a fin-and-tube type heat exchanger comprising an upper end plate, a lower end plate, a plurality of fins disposed in a superposed relationship in layers between the upper end plate and the lower end plate, a plurality of tubes which may be either straight or bent in a U-shaped form, and a plurality of tube members each connected to one of said plurality of tubes at open ends thereof, said plurality of tubes are inserted in openings formed in the upper and lower end plates and fins and are expanded so as to bring the tubes into intimate contact with the fins and securedly clamp them together, each of said tube members is joined to one of said plurality of tubes at the end, each of said tubes project beyond an upper surface of the upper end plate and are formed with a flared portion, each of said tubes includes a straight portion which is expanded for securely fixing the same to the upper end plate and an inner surface fitted to the outside of said tube members in said upper end plate, the ends of said tube members are inserted in said straight portions of the tubes and portions between said tube members and a lower inside portion of the flared portions are braze jointed.

4,502,533
TUBULAR PIPE PART FOR COAXIAL HEAT EXCHANGE

Uffe D. Nielsen, Hexolm, Denmark, assignor to Wavin B.V., Netherlands

Filed Feb. 4, 1982, Ser. No. 345,681
Claims priority, application Netherlands, Feb. 6, 1981, 8100588; Feb. 6, 1981, 8100589
Int. Cl.³ F28D 7/10
U.S. Cl. 165—154 9 Claims



1. A heat exchanging element comprising a plurality of channels, disposed adjacent each other for conveying a heat exchanging fluid, comprising:

a tubular element comprising an inner wall and an outer wall;

partitions extending between said inner and outer walls thereby forming longitudinally extending channels, said channels being closed at at least one end;

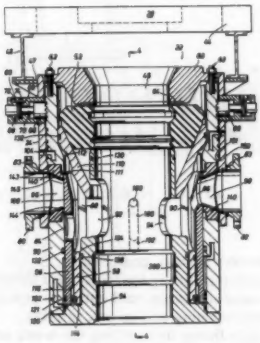
a tubular pipe part sealingly engaging one of said walls of said tubular element, said part forming a fluid supply chamber, said fluid supply chamber being fluidly connected to said channels through an opening in said one of said walls, said tubular pipe part being concentrically spaced with respect to said tubular element;

an outlet chamber disposed adjacent to said tubular element and being fluidly connected to said channels through an opening in one of said walls.

4,502,534
FLOW DIVERTER

Joseph R. Roche, and Charles D. Morrill, both of Humble, Tex., assignors to Hydril Company, Los Angeles, Calif.

Filed Dec. 13, 1982, Ser. No. 449,376
Int. Cl.³ E21B 33/06
U.S. Cl. 166—84 8 Claims



1. A flow diverter adapted for installation below the rotary table of a drilling rig and for connection above a drilling conduit comprising,

a housing having a body portion with a generally vertical bore therethrough, and having at least one outlet passage provided in the wall of the body, the body adapted for connection above the drilling conduit,

an annular packing element disposed within the housing,

first annular piston means adapted for moving from a first position to a second position, whereby in the first position the first annular piston means prevents drilling fluid in the interior of the housing from communicating with the outlet passage in the housing wall, and in the second position the first annular piston means allows fluid communication of interior drilling fluid with the outlet passage,

second annular piston means disposed in the housing for urging the annular packing element to close about an object extending through the bore of the housing, while moving from a third position to a fourth position in the housing,

first actuating means for urging said first annular piston from said first position to said second position,

second actuating means for urging said second annular piston from said third position to said fourth position, said

first and second actuating means cooperatively adapted to begin movement of the first piston from the first position to the second position before said second piston begins to move from the third position to the fourth position.

4,502,535

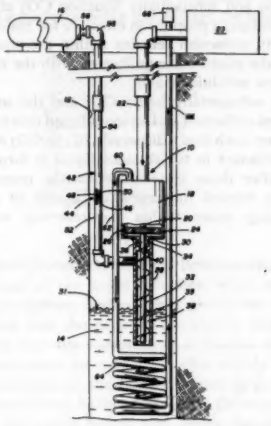
JET ENGINE PUMP AND DOWNHOLE HEATER

William M. Kofahl, Rte. 2, Box 297, Licking, Mo. 65542

Continuation of Ser. No. 264,864, May 18, 1981, Pat. No. 4,401,159. This application Aug. 26, 1983, Ser. No. 526,616

Int. Cl.³ E21B *43/00, 36/02*

U.S. Cl. 166—105 **2 Claims**



1. A pump system for pumping fluid from a first elevation at the bottom of a bore hole to a higher, second elevation at the top of the bore hole, comprising:

a pump disposed within the bore hole;

a jet turbine engine disposed within the bore hole for driving said pump;

means for supporting said jet turbine engine and said pump within the bore hole, said supporting means providing a means for powering said jet turbine engine by supplying a fuel-air mixture thereto from a source at the top of the bore hole and also for removing the exhaust therefrom, said fuel-air mixture pressurized; and

means attached to said pump for removing the fluid pumped by said pump to the top of the bore hole at the second elevation thereof.

4,502,536

SUBMERSIBLE PUMP

John R. Setterberg, Jr., Richardson, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Apr. 28, 1983, Ser. No. 489,537

Int. Cl.³ E21B *43/12, 34/16, 34/10*

U.S. Cl. 166—105.5 **7 Claims**

1. A petroleum production system comprising;

a well tubing,

a surface controlled subsurface safety valve in the tubing,

a well packer and associated H-member in the tubing belowe the safety valve with one leg of the H-member forming a part of said well tubing,

a submersible pump carried by the tubing below the packer,

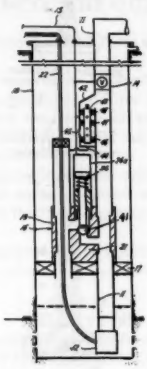
two-way valve means in the H-member providing in one position for liquid circulation upwardly from said one leg through the cross member and downwardly through said other leg of the H-member to provide for circulation through the pump and simultaneously preventing gas flow from said other leg,

said two-way valve means providing in the other position for gas flow from said other leg and preventing flow through said cross-member,

said two-way valve means including resilient means urging the valve means toward said one position and a pressure responsive member urging said two-way valve means toward said other position when pressure is increased on said pressure responsive member,

means controlled from the surface for pressurizing said pressure responsive member,

said valve means when pressurized closing the cross member



of the H-member and providing for gas flow from the other leg of the H-member,

said valve means when depressurized opening said cross member to provide for liquid circulation to said pump and preventing flow of gas from said other leg of the H-member.

4,502,537

ANNULAR SAMPLE CHAMBER, FULL BORE, APR ® SAMPLER

Ernest E. Carter, Jr., Duncan, Okla., assignor to Halliburton Services, Duncan, Okla.

Filed Sep. 23, 1983, Ser. No. 535,083

Int. Cl.³ E21B *49/08, 34/10*

U.S. Cl. 166—162 **19 Claims**

1. An apparatus for use in a test string in a well and adapted to trap and retain a fluid sample from a formation in said well, said apparatus comprising:

a power section assembly, the power section assembly including:

a shear ring assembly section;

a power case connected to the shear ring assembly section, the power case having a plurality of apertures therein to allow fluid communication from the exterior to the interior thereof; and

a power mandrel slidably disposed within a portion of said apparatus, the power mandrel having a portion of the exterior thereof in fluid communication with the apertures in the power case and a portion thereof abutting a portion of the shear ring assembly; and

a sampler section assembly, the sampler section assembly including:

a latch nipple connected to the power case;

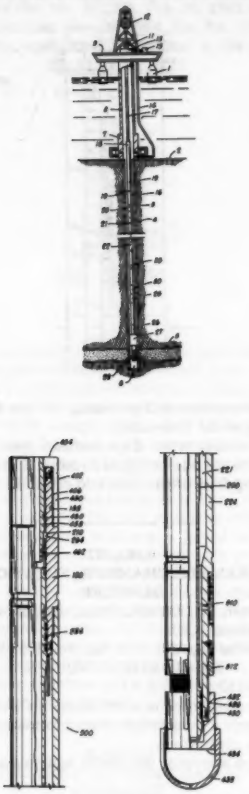
a sample case, the sample case connected to the latch nipple, and having an aperture therein;

a drain sleeve assembly slidably, sealingly, located on the exterior of the sample case;

a bottom nipple connected to the sample case, the bottom nipple having one end thereof adapted for connecting said apparatus to said test string and a bore therethrough; and

a closing sleeve slidably disposed within said apparatus releasably secured to the power mandrel, the closing sleeve operably movable between a first open position allowing said fluid from said formation in said well to flow therethrough and therearound and a second closed position allowing said fluid from said formation in said well to only flow therethrough

whereby an annular fluid sample chamber is formed between the sample case and the closing sleeve in said apparatus in which an amount of said fluid from said formation in said well may be trapped and retained when the closing sleeve



moves from the first position to the second position in said apparatus, said apparatus having an open unrestricted full bore therethrough before and after an amount of said fluid from said formation in said well is trapped and retained in said apparatus.

4,502,538

POLYALKOXY SULFONATE, CO_2 AND BRINE DRIVE PROCESS FOR OIL RECOVERY

Scott L. Wellington; Joseph Reisberg; Eugene F. Lutz, and David B. Bright, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 9, 1984, Ser. No. 569,423

Int. Cl.³ E21B *43/22, 47/06*

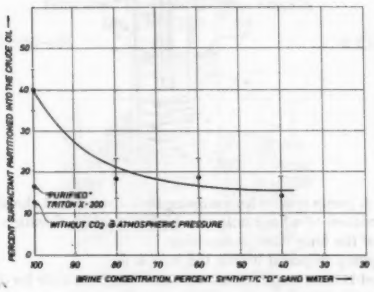
U.S. Cl. 166—252 **21 Claims**

1. In a process in which substantially liquefied CO_2, surfactant, and aqueous liquid are injected into a subterranean oil and water-containing reservoir for displacing oil within the reservoir, the improvement comprising:

selecting a surfactant consisting essentially of at least one water-soluble polyalkoxy sulfonate surfactant which is capable of dissolving in an aqueous liquid that is suitable for being injected into the reservoir, to form an aqueous surfactant solution capable of forming relatively stable dispersions with substantially liquefied CO_2 and the reservoir oil or a substantially equivalent oil at the reservoir temperature, which dispersions consist of, respectively, CO_2 dispersed in the solution, CO_2 and the oil dispersed in the solution, and CO_2 and the solution dispersed in the oil;

adjusting the composition of the surfactant and/or the aqueous liquid to the extent required so that, when a solution of the surfactant in the liquid contains enough surfactant for significantly reducing the mobility of a mixture of the solution and substantially liquefied CO_2 at the reservoir temperature, a proportion effective for maintaining such a mobility reduction remains within the aqueous solution when the mixture is equilibrated with the reservoir oil at the same conditions; and

injecting substantially liquid CO_2 and the so-selected and adjusted surfactant and aqueous liquid into the reservoir in a manner such that a dispersion of the CO_2 in a solution of the surfactant in the aqueous liquid is formed before or soon after those materials enter the reservoir and the initially formed dispersion is capable of preferentially displacing water within the reservoir while flowing



around droplets of the reservoir oil, subsequently dispersing at least some reservoir oil along with the CO_2 within the surfactant solution, and subsequently dispersing CO_2 and surfactant solution with the reservoir oil.

21. A process for selecting a water-soluble polyalkoxy surfactant for use in a reservoir comprising:

measuring foam-forming and oil-partitioning properties of a polyalkoxy surfactant which exhibits significant foam-forming and partitioning-resistance in contact with CO_2 and the reservoir oil at the reservoir temperature and the pressure to be encountered within the reservoir;

measuring those properties of at least one other surfactant which is a member of the same chemical class, and has substantially the same hydrophile-lipophile balance but contains fewer carbon atoms and fewer alkoxy groups; and

selecting for use in the reservoir at least one of said surfactants which contain relatively few carbon atoms and alkoxy groups but are substantially as effective as those of said surfactants which contain more of those groups.

4,502,539

METHOD FOR THE UNDERGROUND GASIFICATION OF COAL OR BROWNCOAL

Arnold W. Grupping, Anjelierenlaan 3, Aerdenhout, Netherlands (2111 BP)

Filed Mar. 2, 1983, Ser. No. 471,246

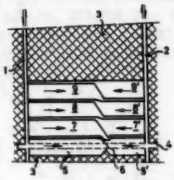
Claims priority, application Netherlands, Mar. 11, 1982, 8201003

Int. Cl.³ C10J *5/00*; E21C *43/00*

U.S. Cl. 166—262 **5 Claims**

1. A method for the underground gasification of coal or browncoal in an inclined coal layer, in which two boreholes are drilled from the ground level into the coal layer, which boreholes are continued downwards in said layer with the slope of said layer, and are interconnected at their lower ends,

after which the coal is ignited, and, furthermore, by supplying an oxygen containing gas through one of the boreholes and discharging the combustion gas through the other borehole, the combustion and gasification front is propagated upslope, care being taken that the boreholes remain in communication with the cavity behind the combustion front, the cavity being intermittently filled with a filler supplied through one of the boreholes, said filling material being suspended in a carrier substance, said suspension being led through the boreholes and



the cavity in such a concentration and flow rate that the filling material, because of the speed reduction when entering the cavity, will precipitate, leading through of this suspension being continued until the cavity is completely filled with the filling material with the exception of a channel at the upper side of this space near the coal front, after which, if required, the carrier substance in the filled chamber is pressed away towards a desired level, further comprising the step of intermittently filling the cavity before said cavity has reached said discharge borehole.

4,502,540

TERTIARY OIL RECOVERY

Don E. Byham, Glenolden, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 269,124, Jun. 1, 1981, abandoned. This application Feb. 4, 1983, Ser. No. 463,699

Int. Cl.³ E21B *43/22*

U.S. Cl. 166—274 **9 Claims**

1. A method for recovering oil from a formation by injecting a slug of an alcohol external microemulsion followed by a drive fluid, said slug and drive fluid being injected into an injection means in operative connection with a recovery means, whereby oil is recovered from said recovery means, said alcohol external microemulsion consisting essentially of:

(i) an amphoteric surfactant of the formula

$$R_1-\overset{\overset{R_2}{|}}{\underset{\underset{R_2}{|}}{N^+}}-R_3-SO_3^-$$

wherein R_1 is an alkyl group containing from about 8 up to about 20 carbon atoms; R_2 comprises a lower alkyl or hydroxysubstituted lower alkyl group; and R_3 is an alkyl group having up to 4 carbon atoms;

(ii) an alcohol containing from about 5 up to about 10 carbon atoms; and

(iii) brine, wherein said microemulsion is essentially free of hydrocarbon additives,

said surfactant and said brine constituting the internal phase of said microemulsion, the amount of said slug being that which is sufficient to increase the amount of oil removed from said formation by the injection of said drive fluid.

4,502,541

STAGED PREFORMED-SURFACTANT-OPTIMIZED AQUEOUS ALKALINE FLOOD

Jimmie B. Lawson, and David R. Thigpen, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 7, 1983, Ser. No. 549,145

Int. Cl.³ E21B *43/22*

U.S. Cl. 166—275 **10 Claims**

1. A process for recovering oil from an acidic oil reservoir comprising:

injecting into the reservoir an oil displacing fluid consisting essentially of a substantially oil-free aqueous alkaline solution containing at least one each of a dissolved alkaline material, a substantially neutral salt and a preformed cosurfactant material;

arranging the composition of the injected fluid so that the initially injected portion contains a larger proportion of the cosurfactant than later injected portions of the fluid; and

recovering oil displaced by the injected fluid.

4,502,542

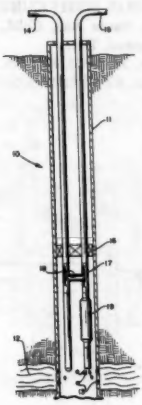
WELL SYSTEM

Robert L. Thurman, McKinney, and Jimmie R. Williamson, Jr., Carrollton, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Sep. 16, 1983, Ser. No. 532,589

Int. Cl.³ E21B *34/10*

U.S. Cl. 166—325 **12 Claims**



1. A well system comprising:

a. a foot valve, connectable in tubing for controlling well flow, including

(1) a body having a bore therethrough and profiled grooves therein,

(2) a valve member and lower seat controlling flow through the bore,

(3) an actuator, having profiled grooves therein, positioning the valve member in open position when the actuator is moved to down position and positioning the valve member in closed position when the actuator is moved to up position,

(4) an upper seat, in said actuator, having a bore therethrough and a shoulder therein,

(5) retaining means, retaining said actuator in down valve member open position or in up valve member closed position; and

b. a tool string to operate the foot valve, including

(1) a standing valve, having an extendable body with an external shoulder thereon engageable with said upper seat shoulder preventing downward movement of the

tool string, a valve member and a seat therein permitting upward flow and preventing downward flow through the body, upper and lower seal means on the exterior of said extendable body sealing between said standing valve and said upper seat bore when said body is not extended and frangible means preventing extension of said extendable body; and

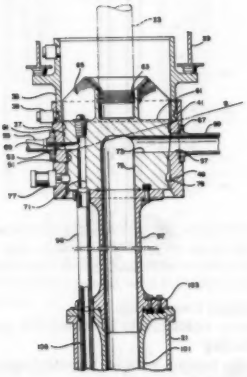
(2) a releasable shifting tool, having keys profiled to selectively engage said actuator grooves and move the foot valve member to open position as the tool string is lowered into the foot valve, and when said tool string is raised from said foot valve said frangible means are sheared and said standing valve body is extended moving said upper body seal means upwardly out of sealing engagement with said upper seat bore, permitting pressure communication to below said standing valve member and seat, moving said releasable shifting tool and engaged actuator upwardly to foot valve closed position and further upward to release said shifting tool from said actuator and raise said tool string from said foot valve.

4,502,543

RISER UNION WITH CURVED SEAT

George F. Outhwaite, Santa Ana, Calif., assignor to Hughes Tool Company, Houston, Tex.

Filed Nov. 23, 1983, Ser. No. 554,741
Int. Cl.[3] E21B *33/035*
U.S. Cl. 166—359 4 Claims



1. In a string of conduit extending from a subsea well to a floating platform having a connection assembly in the string that includes a housing having a longitudinal bore, a head adapted to slide into and seat within the bore of the housing, and a releasable locking means for locking the head into the housing so as to prevent any movement with respect to each other, the improvement comprising in combination:

an annular seat formed in the bore of the housing having a vertically curved configuration; and

an annular seat formed on the exterior of the head and having a vertically curved configuration that is the same as the seat of the housing for mating with the seat of the bore;

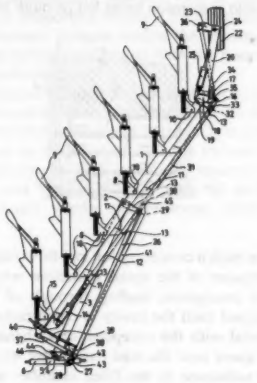
the housing and the head each having a plurality of radial passages that extend to the seats for aligning with each other to transmit fluid between the housing and head.

4,502,544

PLOW ASSEMBLY WITH TURN LIMITER

Kjell-Egil Stangeland, Kleppe, Norway, assignor to Kverneland A/S, Kvernaland, Norway

Filed May 6, 1983, Ser. No. 492,130
Claims priority, application Norway, May 10, 1982, 821529
Int. Cl.[3] A01B *69/00*
U.S. Cl. 172—283 5 Claims



1. A plow assembly comprising:

a frame;

a drag beam having one end pivotally attached to said frame;

means for pivotally attaching the other end of said drag beam to a traction vehicle;

a plurality of plowshares pivotally mounted on said frame by means of plow mounts;

a wheel assembly pivotally supported at the rear of said frame and carrying a steerable wheel;

a strut extending longitudinally parallel to said frame and pivotally connected to said plow mounts and said wheel assembly to form a plurality of interacting parallelograms, said strut being longitudinally displaceable to pivot said plows and said wheel assembly in order to adjust the width of said plow assembly;

steering means interposed between a turning member and said steerable wheel; said turning member being turnable with a traction vehicle when said vehicle pulls said plow assembly and said turning member being adapted to turn said steerable wheel in response to turning of the traction vehicle;

means for pivoting said frame with respect to said drag beam to vary the angle of said drag beam in order to adjust the plow assembly to the track of a traction vehicle when said vehicle pulls the plow assembly;

a turn limiter pivotally attached to said drag beam attaching means and independently pivotable about the same axis as said drag beam, said turn limiter cooperating with stop means on said drag beam attaching means to prevent a traction vehicle when pulling said plow assembly from turning more than a desired angle with respect said plow assembly, thereby preventing the traction vehicle from abutting against said plow assembly when turning sharply, and

a link member having one end pivotally connected to a laterally projecting adjustment arm on said turn limiter and having its other end pivotally connected to said parallel strut such that a parallelogram is defined by the pivot axis between said drag beam and turn limiter and said drag beam attaching means, the pivot axis between said drag beam and said frame, the pivot axis between said parallel strut and said link member, and the pivot axis between said link member and said adjustment arm on said turn limiter, so that said turn limiter is automatically adjusted when

said plow assembly is adjusted to adapt it to the track of a traction vehicle and when the plow strip width of the plow assembly is adjusted, and so that the maximum angle of deflection between the tractor and the turn limiter is held constant regardless of the angles assumed by the drag beam and the frame in relation to the plowing direction.

4,502,545

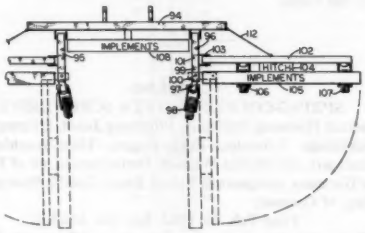
FOLDING TOOL BEAM AND LIFT ASSEMBLY

Chester F. Couser, 1117 Acre St., Guttenberg, Iowa 52052

Continuation of Ser. No. 273,968, Jun. 15, 1981, Pat. No. 4,402,367. This application Aug. 5, 1983, Ser. No. 510,625

Int. Cl.³ A01B *73/00, 23/04*

U.S. Cl. 172—311 **3 Claims**



1. A folding tool beam assembly for implements to be drawn by a tractor comprising:

a draft beam to be hitched in a transverse position to said tractor,

first and second tool beams to which implements are to be hitched,

a longitudinal connecting beam connected between each of said tool beams and said draft beam, said longitudinal connecting beams having respective front ends pivotally connected to said draft beam at points spaced a substantial distance apart on said draft beam to permit space between said tool beams for said implements while said tool beams are in a longitudinal trailing position, each of said longitudnal connecting beams being pivoted to turn only about a transverse horizontal axis,

a first caster wheel assembly connected to the rear end of each of said longitudinal connecting beams,

a hinge connecting one end of each of said first and second tool beams to a respective one of said longitudinal connecting beams at respective positions spaced rearward from said draft beam,

a second caster wheel assembly connected to each of said first and second tool beams at respective positions spaced from said one end thereof, each of said hinges having a folding connecting beam, a first pivot connecting one end of said folding connecting beam to a respective one of said longitudinal connecting beams, and a second pivot connecting the other end of said folding connecting beam to said one end of said respective tool beam, each of said tool beams being disposed substantially perpendicular to said respective folding connecting beam such that said folding connecting beams are substantially folded along said respective longitudinal connecting beam and said respective second pivots are in a forward location with respect to said first pivots while said tool beams are in respective outward transverse working positions, said first and second pivots of said hinges being spaced apart a substantial distance, each of said hinges having respective stops to limit the rotation of said respective second pivot outward about said respective first pivot between said forward location and an outward location such that forward movement of said draft beam relative to said tool beams positions said tool beams in said respective longitudinal trailing positions and rearward movement of said draft beam relative to said tool beams positions said tool beams in said respective outward transverse working positions, each of said first pivots permitting rotation only about a vertical axis and each of said second pivots permitting rotation only about a horizontal axis,

retaining means connected at will between each of said hinges and said respective longitudinal connecting beams to maintain said tool beams in said transverse working positions, and said hinges permitting said tool beams to turn thereabout in only vertical directions to follow contour of ground while said tool beams are retained in said working positions.

4,502,546

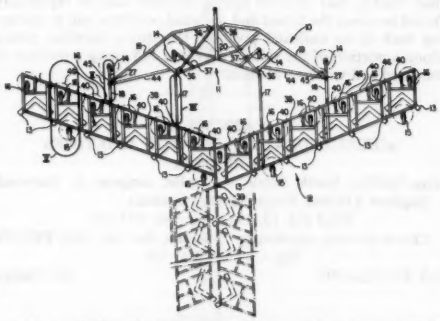
WING BACK IMPLEMENT

Niklaus J. Moos, Lethbridge, Canada, assignor to Versatile Corporation, Vancouver, Canada

Continuation of Ser. No. 311,011, Oct. 3, 1981, abandoned. This application Sep. 26, 1983, Ser. No. 535,534

Int. Cl.³ A01B *73/00*

U.S. Cl. 172—311 **14 Claims**



1. An agricultural implement to be towed by a tractor or the like, comprising:

a frame having wing sections connected at a pivot point, said wing sections each being comprised of a plurality of component sections hingedly connected to each other for pivoting movement about axes parallel to the direction of towing of said implement;

a towing linkage having rigid portions extending laterally of the longitudinal axis of said implement said longitudinal axis being parallel to said direction of towing;

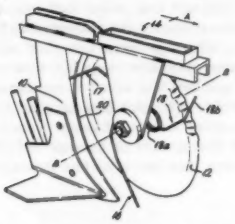
members connected between at least one of said plurality of component sections of said wing sections on opposite sides of said pivot point and said towing linkage, said members extending between said at least one of said component sections intermediate the ends thereof and said towing linkage in a direction substantially parallel to the direction of implement towing and said towing linkage being removable from said members, said wing sections being pivotable rearwardly about said pivot point upon removal of said towing linkage from the outboard ones of said members to bring the most outwardly distant portions of said wing sections into substantially adjacent transportable condition.

4,502,547

SOIL WORKING DEVICE WITH CLEANER

Duncan MacIntyre, Midlothian, Scotland, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 258,296, Apr. 28, 1981, abandoned.
This application May 9, 1983, Ser. No. 492,543
Claims priority, application United Kingdom, Apr. 28, 1980, 8013944
Int. Cl.³ A01B *15/16, 19/10*
U.S. Cl. 172—606 17 Claims



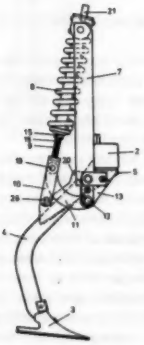
10. A self-cleaning, soil-working assembly comprising frame means for supporting said assembly, a fixed soil-working element depending from said frame, a disc element depending from said frame and positioned ahead of and substantially in alignment with said fixed element and mounted so as to be rotatable, at least one resilient spring member fixed to the side of said disc so as to be movable therewith and between flexed and unflexed positions and having a length sufficient to extend from said disc to said fixed element so that during use, as said disc rotates, said resilient spring member can be repeatedly flexed between the flexed and unflexed positions and in springing back to its unflexed position, the spring member passes along a portion of the side of said disc and along a portion of the fixed soil-working element.

4,502,548

AGRICULTURAL CULTIVATOR AND TINES THEREFOR

Alan Griffin, North Belair, Australia, assignor to Horwood Bagshaw Limited, Edwardstown, Australia

Filed Jul. 13, 1982, Ser. No. 397,683
Claims priority, application Australia, Jul. 16, 1981, PE9770
Int. Cl.³ A01B *61/04*
U.S. Cl. 172—705 11 Claims



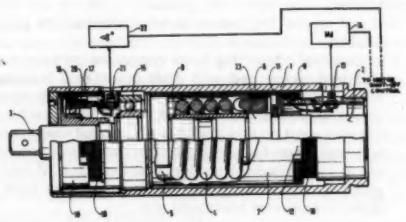
1. A support arrangement for a tyne of a type adapted to allow for a swing back of the tyne when encountering an obstacle within the ground and to provide a restoring force to return the tyne to a tilling position wherein a surface on the tyne is in abutting engagement with the frame after being swung back, comprising a frame, the means supporting the tyne on the frame being characterized by providing for a restoring force that is reduced as the tyne is swung back over an operative range from the tilling position, said supporting means including a tyne pivot point, a pressure rod having remote and proximal ends and defining a line of action, means connecting the proximal end of the pressure rod to the tyne in the tilling position at a point spaced from the pivot point, and means to move the pressure rod line of action towards the pivot point at a rate faster than an imaginary line between said distal end and said spaced point moves towards said pivot point when the tyne swings back, the pressure rod and connecting means being directly forcibly operative on the tyne when such elements are in their respective tilling positions whereby the tyne is positively held in its tilling position by pivotal abutment with the frame.

4,502,549

SPRING-COUPLED POWER SCREWDRIVER

Friedrich Hornung, Stuttgart; Wolfgang Jundt, Ditzingen; Fritz Schädlich, Leinfelden-Echterdingen; Hans-Joachim Vogt, Stuttgart, and Steffen Wünsch, Dettenhausen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 16, 1983, Ser. No. 466,836
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1982, 3210889
Int. Cl.³ B25B *23/14*
U.S. Cl. 173—12 14 Claims



1. Power screwdriver unit having an automatic-stop control and including a motor and a work shaft for mounting a screwdriving tool thereon, said work shaft being coupled to said motor, said power screwdriver unit further comprising:

a drive shaft (2) connected to said motor for being rotated thereby;

a torsion spring (4) interposed between said drive shaft (2) and said work shaft (3) for coupling said shafts to each other;

a segment shell (7,7*a*) disposed exteriorly of said torsion spring (4) for protection thereof;

means (14) responsive to the torque applied to said work shaft for shutting off said motor when said torque exceeds a predetermined torque value, said torque responsive means including a device for measuring the angle of twist between said drive shaft (2) and said work shaft (3), said device comprising at least one inductive transducer (10,18,33,44);

said segment shell (7,7*a*) being constituted at least at one end so as to provide a segment ring (12,31) for said inductive transducer (10,33);

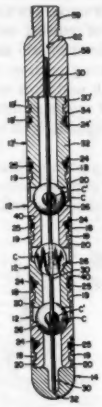
said spring being of such construction that it can be further deformed in torsion after said torque has exceeded said predetermined torque value for an interval sufficient to allow said motor to come to a stop after being shut off while operating at a normal driving speed.

4,502,550

MODULAR THROUGH-TUBING CASING GUN

Barrie G. Ibsen, Nacogdoches, Tex., assignor to Magnum Jet, Inc., Cut Bank, Mont.

Filed Dec. 6, 1982, Ser. No. 446,999
Int. Cl.³ E21B *43/117*
U.S. Cl. 175—4.6 **15 Claims**



1. In a perforating assembly adapted for use in a cased well bore, the combination comprising:

a plurality of shaped charges;

an elongated modular carrier comprising a plurality of charge-supporting, generally tubular modules interconnected in end-to-end relation to one another, each said tubular module having an integrally formed end inserted through an end of each next tubular module for releasable engagement directly therewith, each said tubular module having an inner passage and an inner wall portion projecting inwardly into said inner passage defining an arcuate horizontally disposed cradle for supporting one of said shaped charges thereon, said one of said shaped charges supported on said cradle to extend transversely across said passage, each of said charges being secured in each of said tubular modules by said cradle and by said integrally formed end of the adjacent tubular module in contact with a surface of said shaped charge diametrically opposite said cradle; and

a blasting cord extending across one end of each of said shaped charges.

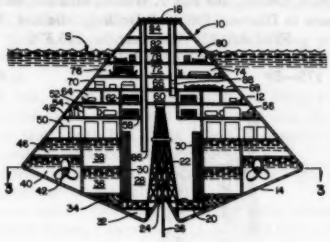
4,502,551

DEEP DRAFT DRILLING PLATFORM

Kenneth C. Rule, 1121 Heatherwood La., Fort Collins, Colo. 80525, and Frank W. Michael, 935 Valley View Rd., Fort Collins, Colo. 80524

Filed Apr. 1, 1982, Ser. No. 364,491
Int. Cl.³ E21B *7/124, 7/132*
U.S. Cl. 175—6 **9 Claims**

5. An offshore drilling platform, comprised of a submersible body that includes a sufficiently large bottom portion and narrower elongated top portion to have a center of buoyancy nearer its bottom than its top and weighted disproportionately at its bottom to have a center of gravity of the platform a sufficient distance below the center of bouyancy to stabilize the platform in a submerged condition, wherein said submersible body is in the form of two truncated conical sections having a common base, the upper one of said conical sections having an altitude at least two-thirds as large as the diameter of the common base, and the lower one of said conical sections



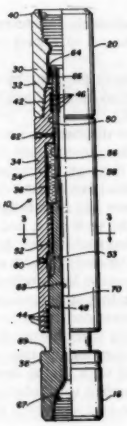
having an altitude of not more than one-third the altitude of the upper conical section.

4,502,552

VIBRATORY ROTARY DRILLING TOOL

Leo A. Martini, 2624 Montclair, Mesquite, Tex. 75150

Continuation-in-part of Ser. No. 360,202, Mar. 22, 1982, abandoned. This application Jan. 26, 1983, Ser. No. 461,216
Int. Cl.³ E21B *7/24*
U.S. Cl. 175—56 **27 Claims**



1. A vibratory rotary drilling tool comprising:

a mass adapted for rectilinear oscillation in response to impulsive forces having a frequency;

a housing in which is slidably mounted at least a portion of said mass;

a spring for providing linear restoring forces to said mass;

a sealed chamber containing said spring within said housing;

said mass being adapted for co-movement with a drill bit, whereby said drill bit, said mass and said spring act as a spring-mass system having a fundamental frequency;

said impulsive forces constituting vibrations of said drill bit as said drill bit is rotated during drilling; and

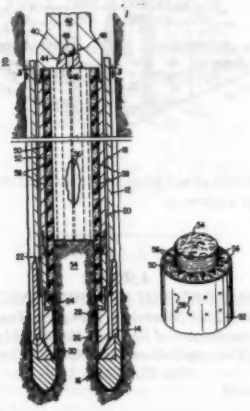
wherein the ratio of the frequency of said impulsive forces of said drill bit to the fundamental frequency of said spring-mass system is substantially within the range of 0.25 to 1.5, and the ratio of actual damping to critical damping of said spring-mass system is substantially 0.5 or less, such that the oscillations of said mass and drill bit are reinforced and amplified thereby.

4,502,553

SPONGE CORING APPARATUS WITH REINFORCED SPONGE

Arthur Park, Odessa, and Bob T. Wilson, Midland, both of Tex., assignors to Diamond Oil Well Drilling, Midland, Tex.

Filed Jul. 13, 1983, Ser. No. 513,376
Int. Cl.³ E21B *25/06*
U.S. Cl. 175—59 **15 Claims**



1. An apparatus for absorbing subterranean fluid from a core disposed in the inner barrel of a well coring apparatus, comprising:

a right circular support member having a hollow interior open at both ends and dimensioned to fit adjacent the sides of the inner barrel;

an absorbent member disposed in said support member and attached to the sides thereof, said absorbent member having a bore formed through the center thereof and oriented along the longitudinal axis of the well coring apparatus for receiving a well core and absorbing the subterranean fluid that bleeds from the well core; and

reinforcing means disposed interior to said absorbent member and attached to said support member for providing reinforcement along the longitudinal axis of the well coring apparatus such that structural integrity of said absorbent member is maintained under forces resulting from the core passing into the inner barrel of the well coring apparatus during the forming of the core, said reinforcing means dimensioned such that it does not extend through said absorbent member to contact the core as the core passes upward into said absorbent member.

4,502,554

EXPANSIBLE TOOL FOR REAMING FRUSTOCONICAL UNDERCUTS IN CYLINDRICAL HOLES

Richard H. Jones, P.O. Box 108, Baton Rouge, La. 70821

Filed Jun. 2, 1982, Ser. No. 384,252
Int. Cl.³ E21B *7/28*
U.S. Cl. 175—285 **6 Claims**

1. An expansible rotary power tool for reaming frustoconical undercuts in the walls of cylindrical holes, comprising:

a. an elongated cylindrical sheath, having an enlarged diameter open upper end, a reduced diameter lower end and an axial passageway extending substantially the length of said sheath;

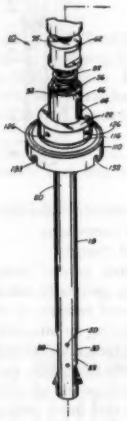
b. said sheath being further provided with a pair of opposing longitudinal slots adjacent said lower end of the tool, communicating with said passageway and each adapted to receive a cutting assembly therein;

c. a tubular ram substantially disposed in reciprocal, sliding relationship within said sheath, said ram having an enlarged diameter upper portion positioned above said sheath upper end and a lower portion extending substantially the length of said axial passageway, said ram being further provided with a power engaging head at the upper portion and a clevis at the lower end thereof, said clevis being disposed adjacent said slots;

d. bias means resting upon a shoulder means on the inside wall of said sheath upper end and biasing said ram by abutting against its upper portion;

e. at least a pair of cutting assemblies being pivotally mounted on the clevis of said ram, and means for extending the lower cutting portion of said cutting assemblies outwardly through said slots when the ram is advanced against the bias of said bias means, said cutting portions substantially overlapping each other during a non-operation;

f. each of said cutting portions being provided with a blade having a diamond impregnated cutting surface, said blade being mounted within a recess in the lowermost part of



said cutting portion, the diamond-impregnated cutting surface being disposed at an acute angle to a cutting face of said cutting portion;

g. a load bearing collar assembly mounted in surrounding engagement to said sheath intermediate said upper and lower ends of the sheath for stopping the advancement of the tool into the hole being undercut;

h. a means for introducing fluid into said tubular ram for cooling and flushing said cutting portions during reaming, said means comprising a conduit means providing fluid communication between a source of fluid and axial bore of said ram, said bore extending the length of said ram, said fluid introducing means further comprising a beveled recess in upper parts of said cutting portions for providing a flow of fluid directed at an angle to a longitudinal axis of said tool into said hole and to a place adjacent the position of said blades during operation; said means for introducing said fluid flow cooperating with a means for removing debris from the hole during operation.

4,502,555

PORTABLE WEIGHING SYSTEM FOR AIRCRAFT

David Gower, Toms River, N.J., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Sep. 16, 1983, Ser. No. 532,851
Int. Cl.³ G01G *19/02*; G01M *1/12*; G06F *15/20*
U.S. Cl. 177—25 **1 Claim**

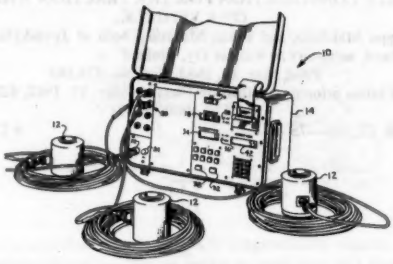
1. A system to calculate weight parameters of an aircraft comprising:

a plurality of strain gauge load cells sensed by direct current

voltage means providing analog voltage outputs in proportion to the load on each load cell, said plurality of load cells being placed intermediate different portions of the aircraft and a solid, earth-referenced surface;

means to convert the analog voltage outputs from the load cells into digital signals;

memory storage means to retain data descriptive of the configuration of the aircraft, a portion of such data being pre-programmed in the memory storage means and addressable via labelling indicative of particular aircraft



model and series numbers with the remainder of such data being entered by an operator of the system in the event the required data was not pre-programmed; and

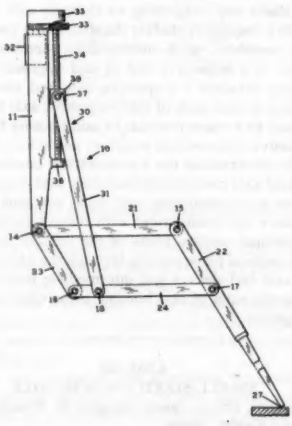
computation means to convert the digital signals essentially simultaneously into output information of load on a single load cell, or aircraft gross weight, or aircraft center of gravity or aircraft center of gravity expressed as a percentage of the mean aerodynamic chord of the aircraft such that load cell outputs which contain not insubstantial non-linear components may be processed by the computation means.

4,502,556

VERTICAL ACTUATOR MECHANISM FOR THE LEGS OF A WALKING MACHINE

Stephen J. Bartholet, Orange, Calif., assignor to Odetics, Inc., Anaheim, Calif.

Filed Mar. 18, 1983, Ser. No. 476,583
Int. Cl.³ B62D *57/02*
U.S. Cl. 180—8.6 **8 Claims**



1. A leg mechanism and actuator therefor comprising:

a frame member;

a first elongate link, a first end of said first link being pivotally connected to said frame member;

a second link, a first end of said second link being pivotally connected to a second end of said first link, the second end of said second link forming a foot;

a third link, a first end of said third link being pivotally connected to said frame member and said first end of said first link;

a fourth link, a first end of said fourth link being pivotally connected to the second end of said third link, the second end of said fourth link being pivotally connected to an intermediate point on said second link;

drive means connected to said frame member and adapted for linear movement only; and

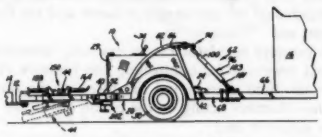
an actuator strut, a first end of said strut being connected to said drive means, a second end of said strut being pivotally connected to an intermediate point on said fourth link, said point on said fourth link being selected so that said foot moves approximately linearly as said strut pivots around said first end thereof.

4,502,557

SPEED CONTROL APPARATUS FOR POWERED TRAILER

Rogers H. Anderson, 10501 Bloomington Freeway, Bloomington, Minn. 55420

Filed Sep. 30, 1982, Ser. No. 429,970
Int. Cl.³ B60D *1/14*
U.S. Cl. 180—14.2 **7 Claims**



1. A load bearing powered trailer for assisting a powered vehicle in moving a load trailer, the powered trailer comprising:

a main frame having a forward end and a rearward end;

a pair of wheels movably supporting the main frame;

an internal combustion engine mounted on the main frame and having a carburetor assembly operably connected thereto;

automatic transmission means for transmitting mechanical power from the engine to the wheels;

a tongue assembly for selectively connecting the powered trailer adjacent the forward end of its main frame to the vehicle, the tongue assmbly having a first member adapted to be connected to the vehicle and a second member connected to the powered trailer, the first member being movable in a first direction and a second, opposite direction with respect to the second member, the position and motion of the first member relative to the second member being dependent upon the position and motion of the vehicle relative to the powered trailer;

hydraulic actuator sensing means for sensing the position and motion of the first member relative to the second member which includes:

a control pin fixedly mounted on the first member of the tongue assembly, and

a hydraulic sensing actuator having a piston rod and a cylinder portion, the cylinder portion of the sensing actuator being fixedly mounted on the second member of the tongue assembly with its respective piston rod extending in direction to engage the control poin so that movement of the first member in the first direction relative to the second member causes movement of the piston rod in the cylinder portion of the sensing actuator;

hydraulic engine speed control means for controlling the speed of the engine dependent upon the position and motion sensed by the hydraulic actuator sensing means to simultaneously change the pushing and pulling power of the powered trailer in coordination with the powered vehicle the speed control means having:

a double-acting hydraulic carburetor actuator having a piston rod and a cylinder portion, the cylinder portion thereof having a piston rod retraction chamber and a separate piston rod extension chamber, the piston rod being operably connected to the carburetor assembly such that movement of the piston rod of the carburetor actuator controls acceleration of the engine, and

first hydraulic fluid connection means for connecting the sensing actuator and one of the chambers of the carburetor actuator so that movement of the piston rod of the sensing actuator causes movement of the piston rod of the carburetor actuator, thereby controlling engine acceleration;

fluid pressure bias means for constantly urging the piston rod of the carburetor actuator toward a direction which opposes acceleration of the engine so that the engine accelerates when the force of the hydraulic fluid caused by movement of the piston rod of the sensing actuator in response to movement of the control pin in the first direction overcomes the urging force of the pressure bias means, the pressure bias means having:

a hydraulic fluid reservoir,

second fluid connection means for connecting the other chamber of the carburetor actuator and the fluid reservoir, and

fluid pressure regulator means operably mounted on the fluid reservoir for controlling the pressure of the hydraulic fluid therein and the force of the fluid in the other chamber acting on the piston rod of the carburetor actuator; and

hitch means for selectively connecting the powered trailer adjacent the rearward end of its main frame to the load trailer.

4,502,558

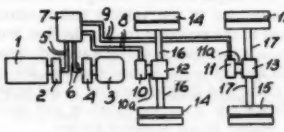
POWER DRIVE SYSTEM FOR ROAD VEHICLES

Ambrogio Mauri, Via Garibaldi 254, Desio (Province of Milano), Italy

Continuation-in-part of Ser. No. 202,908, Nov. 3, 1980, abandoned. This application Mar. 7, 1983, Ser. No. 472,553

Int. Cl.³ B62D *59/04*

U.S. Cl. 180—14.3 **4 Claims**



1. A power driven system for road vehicles, in particular public transportation and semitrailer vehicles in combination with the body and suspension structure of the vehicle, comprising at least one prime motor supported on the body structure of the vehicle and utilising a first type of energy source, at least one hydraulic pump on said body structure and driven by said prime motor thereby to convert the energy of said motor into first pressure fluid energy, at least one primary motor supported on said body structure at a distance from said prime motor and utilising a second type of energy source different from said first one, at least one second hydraulic pump on said body structure and driven by said primary motor thereby to convert the energy of said primary motor into second pressure fluid energy, at least one differential gear on at least one axle of said vehicle and at least one hydraulic motor transmissively connected with said differential gear, controllable means being provided connecting said first and second hydraulic pumps with said at least one hydraulic motor thereby to convey selectively said first and said second pressure fluid energy from said hydraulic pumps to said at least one hydraulic motor, said hydraulic motor driving said differential gear and the axle and the wheels mechanically connected therewith.

4,502,559

AXLE CONSTRUCTION FOR THE TRACTION WHEELS OF A VEHICLE

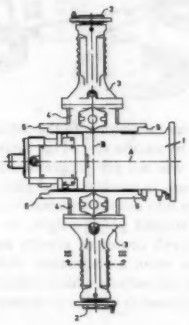
Seppo Mäkitalo, and Erkki Mänttäri, both of Jyväskylä, Finland, assignors to Valmet Oy, Finland

Filed Mar. 10, 1983, Ser. No. 474,185

Claims priority, application Finland, Mar. 17, 1982, 820911

Int. Cl.³ B60K *17/28*

U.S. Cl. 180—75 **5 Claims**



1. An axle construction for the traction wheels of a vehicle, such as a tractor, comprising:

a housing having opposite transverse sides enclosing drive means for driving shafts of said axle construction;

axle components including a pair of axially aligned shafts coupled to said drive means and extending from respective opposed sides of said housing, each shaft adapted to have a traction wheel mounted thereon, a pair of axle supports coupled to respective opposed sides of said housing, each axle support accommodating a respective one of said shafts and comprising an elongate axle bed sleeve in which a respective shaft is situated, and a pair of intermediate members, each intermediate member being connected to a respective one of said opposed sides of said housing between a respective axle bed sleeve and said housing so that each of said respective axle bed sleeves is coupled to a respective side of said housing by means of a respective intermediate member; and wherein

said axle construction has a symmetrical configuration such that said axle components including said elongate axle bed sleeves accommodating said shafts and said intermediate members are symmetrical with respect to both a central longitudinal vertical plane of the vehicle and to a transverse vertical plane passing through the axis of said shafts, said axle bed sleeves and intermediate members on both transverse sides of said housing being identical and interchangeable.

4,502,560

SMALL-SIZED SNOWMOBILE

Itaru Hisatomi, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Filed Mar. 14, 1983, Ser. No. 475,123

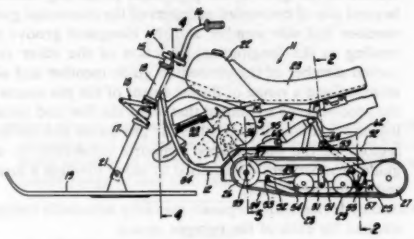
Claims priority, application Japan, Jul. 20, 1982, 57-126226

Int. Cl.³ B62M *27/02*

U.S. Cl. 180—190 **4 Claims**

1. In a small, lightweight vehicle having frame means, a

single front ski supported for steering movement by said frame means, a rider's seat carried by said frame means, a relatively narrow endless driving belt of a width narrower than said rider's seat and beneath said rider's seat, power means for driving said driving belt, said driving belt having a drive portion thereof positioned for engaging the terrain over which said vehicle is operated for driving said vehicle therealong, the improvement comprising suspension means for supporting said drive belt and said frame means for relative pivotal movement



about an axis that extends generally longitudinally relative to said frame means so that an operator may lean said frame means relative to said driving belt without changing the area of engagement between said driving belt and the terrain, and means for limiting the pivotal movement of said frame means relative to said driving belt along said longitudinal axis so that the center of gravity of said vehicle does not move beyond the peripheral edges of said front ski when said front ski maintained in a straight ahead position and the frame means pivots relative to the drive belt about the longitudinal axis.

4,502,561

TRACTOR-TRAILER COMBINATION WITH A COUPLING CONNECTION

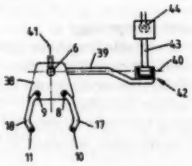
Kurt Kober, Kötz; Rudolf Wöhrle, Tschenhausen-Rieden, and Robert Köhler, Kemnat, all of Fed. Rep. of Germany, assignors to Alois Kober AG, Kötz, Fed. Rep. of Germany

Filed Dec. 1, 1982, Ser. No. 445,952

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1981, 3149700

Int. Cl.³ B60D *1/14, 1/06;* **B62D** *53/04*

U.S. Cl. 280—446 B **9 Claims**



1. A tractor-trailer combination which comprises:
a tractor vehicle;
a ball-headed coupling part fixed to said tractor vehicle and disposed rearwardly of a center of gravity thereof beyond the rear of said tractor vehicle;
a trailer vehicle rearwardly of said tractor vehicle; and
a hitch connecting said vehicles, said hitch comprising:
a bridge member swivelably connected to said ball-headed coupling part;
at least one outrigger arm extending horizontally from said bridge member and braced against said tractor vehicle at a location horizontally spaced from said ball-headed coupling part;
a linkage including a pair of pivots connected with said trailer vehicle, a pair of pivots formed on said bridge member, and respective bars extending generally beteen the pivots of said pairs for articulating said trailer vehicle to said tractor vehicle through said hitch, said pivots and said bars being disposed such that an intersection of lines connecting the pivots linked by said bars lies forwardly of said ball-headed coupling part in the direction of said center of gravity; and
hinge means defining the horizontal articulation substantially through said ball-headed coupling part in a direction perpendicular to a drive direction of the tractor-trailer combination for said hitch relative to said tractor vehicle.

4,502,562

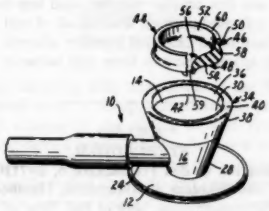
STETHOSCOPE WITH REMOVABLE INSERT

Carl T. Nelson, North St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 28, 1983, Ser. No. 479,158

Int. Cl.³ A61B *7/02*

U.S. Cl. 181—131 **12 Claims**



1. A stethoscope head comprising:
a. a body having a bore therein;
b. a bell connected to the body and having a central aperture in the bottom thereof opening into the bore in the body and comprising (1) an inner, generally bell-shaped side wall, (2) an outer side wall and (3) a continuous peripheral rim connecting the inner side wall to the outer side wall;
c. a resilient, deformable cover over the rim; and
d. a resilient, deformable insert juxtaposed the inner side wall of the bell and having an aperture therein axially aligned with the aperture in the bell and including an annular ridge which engages the bell and the resilient cover to releasably lock the insert within the bell and adjacent the inner side wall of the bell.

4,502,563

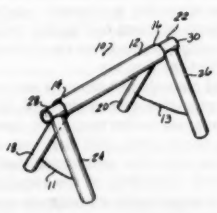
COLLAPSIBLE HORSE

Jacob A. Pershon, 47547 Fairchild, Mt. Clemens, Mich. 48045

Filed Nov. 21, 1983, Ser. No. 553,378

Int. Cl.³ F16M *11/00*

U.S. Cl. 182—153 **2 Claims**



1. A collapsible horse for supporting laterial members, such as planks and the like, of the type comprising a stringer and

laterally opposite, downwardly divergent legs carried by each end portion of the stringer, said collapsible horse comprising:

a first tubular member comprising a portion of said stringer;

first and second legs respectively carried at the opposite ends of said first tubular member and secured thereto such that said first tubular member and said first and second legs lie in the same plane when so secured;

a second tubular member forming the remaining portion of said stringer and being telescopically received in said first tubular member and adapted to pivot about its longitudinal axis within said first tubular member;

third and fourth legs respectively carried at the opposite ends of said second tubular member and secured thereto such that said second tubular member and said third and fourth legs lie in the same plane when so secured, the length of said second tubular member exceeding the length of said first tubular member by at least the width of said third and fourth legs, at least one of said third and fourth legs being secured to said second tubular member after it is telescopically received by said first tubular member to permit assembly of said second tubular member within said first tubular member, said legs being movable from a collapsed position wherein all of said legs lie in the same plane to an extended position wherein said legs are laterally spaced apart to form said horse in an operative position.

4,502,564

STEPLADDER

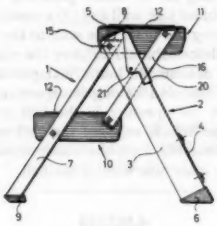
Walter Kümmerlin, In den Fresslickern 6, D-7120 Bietigheim-Bissingen, and Nikolaus A. Kümmerlin, Humboldtstrasse 26, D-7730 VS-Schwenningen, both of Fed. Rep. of Germany

Filed Mar. 29, 1983, Ser. No. 480,165

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1982, 3212847; Oct. 5, 1982, 3236781; Nov. 4, 1982, 3240682

Int. Cl.³ E06C *1/387*

U.S. Cl. 182—161 **24 Claims**



1. A stepladder comprising

a first leg and a second leg,

a shaft around which said legs are pivotally mounted relative to each other in a region of their upper end, each of the first and second legs having a pair of side members,

plate-shaped supports each pivotally connected to said side members of the first leg around a respective first axis, the plate-shaped supports having rear regions, respectively,

respective guide members are parallel to the respective side members of the first leg,

each of said plate-shaped supports are connected swingably at the respective rear regions of the respective plate-shaped support to the two guide members around a respective second axis, said first and second axes extend parallel to each other and to said shaft, the latter permitting pivotal spreading of the two legs, and said plate-shaped supports upon a maximum spreading of the legs form steps of a stair,

said guide members being located behind the side members of the first leg and, in the maximum spreading position of the first and second legs, being spaced from the side members of the first leg,

connecting means for connecting one of said guide members to one of the side members of the second leg and the other said guide member to the other said side member of the second leg, respectively,

said connecting means each including an elongated groove and a pin means engaging into said groove, and means for displaceably guiding said pin means in a longitudinal direction of the groove, the pin means projecting laterally beyond one of connected members of the connected guide member and side member and the elongated groove extending in the longitudinal direction of the other connected member of the connected guide member and side member, and a range of displacement of the pin means in the groove being so limited that when the first and second legs move towards each other the pin means and the rear regions of the plate-shaped supports connected to the guide members are constrained to move towards a lower end of the stepladder,

a locking device with a separate manually actuatable locking element for each of the two pin means,

said locking element being movably supported on the connected member provided with the elongated groove and in the position of the maximum spreading of the two legs positively secures the pin means against movement in the elongated groove.

4,502,565

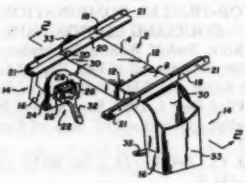
WORK SUPPORT

James R. Koffski, R.R. #4, Duncan, British Columbia, Canada

Filed Oct. 20, 1983, Ser. No. 543,948

Int. Cl.³ F16M *11/00*; E04G *1/32*

U.S. Cl. 182—184 **10 Claims**



1. A work support comprising:

a cross member of variable length for receiving and supporting at least one supported member, the cross member being in two separable sections, one section being adapted to telescope within the other;

means for enabling said two sections to be held in a fixed spaced apart relationship whether or not telescoped together;

leg support means extending downwardly and outwardly from each end of the cross member;

respective stops fixedly attached to each of said sections adjacent an end thereof; and

means to hold a leg in each leg support means.

4,502,566

WALL STAND-OFF APPARATUS

Harold R. Wing, Springville, Utah, assignor to Little Giant Industries, Inc., Provo, Utah

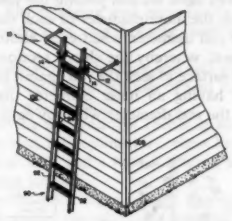
Filed Mar. 28, 1983, Ser. No. 479,220

Int. Cl.³ E06C *7/48*

U.S. Cl. 182—214 **29 Claims**

1. A wall stand-off apparatus for supporting a ladder adjacent to a substantially vertical surface, said ladder having a pair of side rails for supporting a plurality of ladder rungs therebetween, and said apparatus comprising:

first means for supporting said ladder at a spaced distance from said surface; and



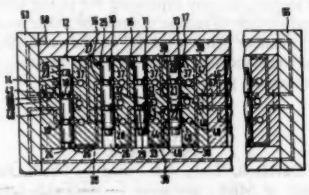
second means, connected to said first means, for removably clamping said first means to said ladder; said second means being capable of selective clamping either to one of said ladder rungs or said side rails.

4,502,567

PROGRESSIVE LIQUID DISTRIBUTOR

Alfred Kärcher, Caixa Postal 18.908, BR-0 1000 Sao Paulo, S.P., Brazil

Filed Mar. 28, 1983, Ser. No. 479,566
Claims priority, application Brazil, Apr. 5, 1982, 8201989
Int. Cl.³ F01M *1/06;* F16N *25/02*
U.S. Cl. 184—7.4 **10 Claims**



1. A progressive distributor device for a liquid medium, particularly a lubricant, operating with a recurrent working cycle, comprising a plurality of distributors each having a housing and at least three consecutively displaceable working pistons mounted in cylinders of each housing and extending in parallel, the distributors being juxtaposed and hydraulically connected to each other in a manner so that for the working cycle, a first working piston of a first one of the distributors controls a second working piston of a last one of the distributors, and a first working piston of the last distributor controls a second working piston of a next to the last one of the distributors, a second working piston of each of the distributors connected to control a third piston of another distributor, with the third piston controlling a fourth piston of its distributor.

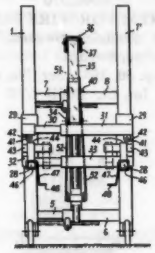
4,502,568

FORK-LIFT TRUCK WITH SYNCHRONIZED VARIABLE TRAVELLING AND LIFTING SURFACES

Charles J. P. Lebre, 35 rue de l'Orangerie, F-91700 Sainte Genevieve des Bois, France

Division of Ser. No. 458,083, Jan. 14, 1983, Pat. No. 4,458,786, which is a continuation of Ser. No. 202,828, Oct. 31, 1980, abandoned. This application Apr. 27, 1984, Ser. No. 604,698
Claims priority, application France, Nov. 6, 1979, 79 27278; Dec. 17, 1979, 79 30911
Int. Cl.³ B66B *9/20*
U.S. Cl. 187—9 R **9 Claims**

1. A fork-lift truck with synchronized variable travelling and lifting surfaces, comprising two substantially symmetrical and independent sub-assemblies, each sub-assembly comprising a vertical mast, a horizontal side-frame integral with said mast, each sub-assembly including a pair of wheels, one of said wheels being rotatably secured to said sub-assembly adjacent said mast and extending therebelow and the other wheel being rotatably secured to said sub-assembly at the end of said side-frame remote from said mast and extending therebelow, two parallel cross pieces disposed at different heights integral with said mast and extending normal thereto, and a support for a lifting arm slidable along said mast and having at least one cross piece, the cross pieces of one of said sub-assemblies being slidable inside corresponding cross pieces of the other sub-



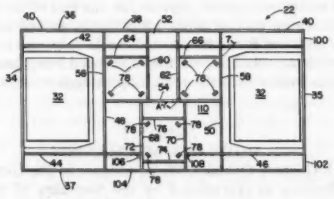
assembly thus allowing easy adaptation of the width of the truck to the load to be taken up, control means provided for a synchronized control of the sliding of said cross pieces, a hydraulic liting device consisting of at least one hydraulic jack of which a cylinder is fixed to the cross pieces integral with the masts and a mobile rod of the hydraulic jack supports a pulley over which runs a connecting member, said connecting member having one end integral with a fixed part of the truck and the other end fixed to a sliding cross piece of the support of the lifting arms.

4,502,569

TRANSPORTABLE HEAVY-LIFT APPARATUS

Steven R. Loechner, Roanoke, Ind., assignor to G & L Corporation, Fort Wayne, Ind.

Filed Apr. 21, 1982, Ser. No. 370,208
Int. Cl.³ B66B *11/04*
U.S. Cl. 187—17 **5 Claims**



1. A transportable heavy-lift apparatus for moving heavy objects, comprising:

a base housing having a floor plate, opposed side plates and opposed end plates upstanding from said floor plate to form a continuous wall, a top plate secured to said continuous wall, and means in said base housing for substantially uniformly distributing load forces to said floor plate,

a plurality of cylinder members being vertically supported by said base housing in an arrangement that substantially aligns the common vertical lift vector of said cylinder members with the center of said base housing,

a load platform attached to the top end portions of said cylinder members, and

fluid actuating means disposed in said base housing for vertically moving said cylinder members and said load platform, whereby load forces received by said cylinder members in moving an object carried on said load platform are

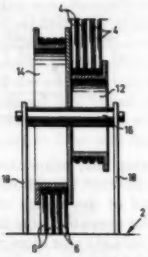
substantially uniformly distributed to said base housing floor plate by said distributing means, said distributing means comprising a plurality of selectively arranged interconnecting inner plates secured to and between said floor and top plates, two of said inner plates being spaced apart and extending between said side plates to define a base housing midportion therebetween, and base housing end portions between respective ones of said two inner plates and said end plates.

4,502,570

DRIVE SYSTEM FOR WIRE ROPE HOISTS

Tage S. Westerlund, Skellefteå, Sweden, assignor to Linden-Alimak AB, Skellefteå, Sweden

Filed Sep. 30, 1982, Ser. No. 431,295
Int. Cl.³ B66B 7/10
U.S. Cl. 187—22 **6 Claims**



1. A traction drive system for wire rope hoists comprising a hoist cage arranged to traverse a substantially vertical path, a traction sheave positioned at one end of said path, an idler sheave positioned at the other end of said path, two drums mounted for rotation upon said hoist cage, a loop of rope for supporting the cage and having one end wrapped around and attached to a first one of said drums, said loop of rope extending from said first drum around said traction sheave and said idler sheave and having the other end wrapped around and attached to the other one of said drums, said drums being mutually coupled for rotation at different peripheral speeds for taking up and paying out the ropes thereto at different speeds, the mutual coupling and the direction of the wrapping of the wrapped portions of the ends of said rope loop upon said drums being arranged to provide for one end of the rope loop to be taken up on one drum while the other end of the rope loop is paid out from the other drum in response to mutually coupled drum rotation with the rope speed being greater from the drum from which the rope loop extends downwardly.

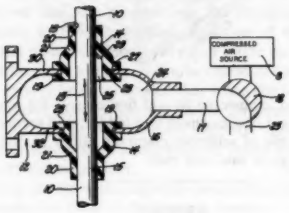
4,502,571

ROD LOCK MECHANISM

Erwin F'Geppert, Oakland, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 26, 1982, Ser. No. 444,556
Int. Cl.³ B65H 59/10
U.S. Cl. 188—67 **1 Claim**

1. In a system wherein a rod is linearly movable along its axis, the improvement comprising mechanism for locking said rod in selected positions of adjustment: said locking mechanism comprising a rigid housing having opposed walls (30 and 32), each wall having an opening (28) therein designed to have the aforementioned rod pass freely therethrough; an annular rod-gripper means mounted in each said opening in each said wall; means for admitting compressed air from a remote supply into the housing to operate each rod-gripper means between a rod-locked position and a rod-released position; and valve means (18) operable to alternately expose the housing interior space to the compressed air supply or to the atmosphere; each said rod-gripper means comprising an annular elastomeric member that includes an annular plug section having an annular groove in its outer surface receivable around the edge of the associated wall opening, an axially elongated cylindrical sleeve section of lesser outside diameter than said plug section, and an annular tapered neck section joining the plug section and the sleeve section; the inner diameter of each sleeve section being less than the rod diameter when each elastomeric member is initially formed, whereby the sleeve section normally tightly grips the rod surface to lock the rod against linear motion; each plug section having an inner diameter that is substantially greater than the rod diameter whereby each plug section and



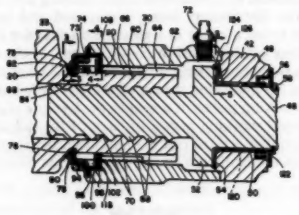
associated neck section form a pressurizable chamber (25) around the rod surface; each sleeve section having a substantial axial dimension for extensive area gripment on and along the rod surface; each sleeve section being thin enough in the radial direction that compressed air within the associated pressurizable chamber is able to move into the interface between the rod and sleeve section, thereby expanding the sleeve section away from the rod surface to release the rod for linear motion; each elastomeric member being arranged on the associated housing wall so that the associated sleeve section is located outwardly from the associated plug section.

4,502,572

DISC BRAKE

Donald J. Davidson, Troy, and David D. Sheill, Farmington Hills, both of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 31, 1983, Ser. No. 528,328
Int. Cl.³ F16D 55/08
U.S. Cl. 188—72.8 **4 Claims**



1. An improved disc brake of the type which includes a disc mounted for rotation about an axle, a brake housing mounted on said axle in alignment with a friction surface of said disc, an axially movable braking piston having an interior end at least partially mounted within said housing and an external end outwardly of said housing adjacent said friction surface of said disc, said braking piston having a plurality of axially extending splines about an exterior surface of said interior end to mate with correponding splines on an interior surface of said housing to limit rotation of said braking piston relative to said housing, brake actuation means mounted on said housing, a powershaft mounted within said housing in coaxial alignment with said braking piston and capable of selective rotation by said brake actuation means, said powershaft having worm gear

teeth thereon engaged with mating teeth on said interior end of said braking piston to produce axial movement of said braking piston toward and away from said friction surface of said disc directly corresponding to said selective rotation of said power-shaft, and means for supplying and periodically resupplying lubricant to an interior of said housing, said improvement comprising:

sealing means between said housing and said interior end of said braking piston to prevent loss of said lubricant from said interior of said housing;

said housing having a cylindrical recess in an end thereof adjacent said disc, said cylindrical recess having an interior cylindrical wall and a base including a radially extending annular surface;

said sealing means including a sealing ring made of resiliently compressible material and installed within said cylindrical cavity;

said sealing ring having an outer peripheral edge making contact with said cylindrical wall of said cylindrical cavity and an interior edge including a plurality of teeth which are compressed to be received in and make sealing contact with said plurality of axially extending splines about said exterior surface of said interior end of said braking piston; and

means for retaining said sealing ring within said cylindrical cavity.

4,502,573

AUTOMATIC-ADJUSTMENT DRUM BRAKE

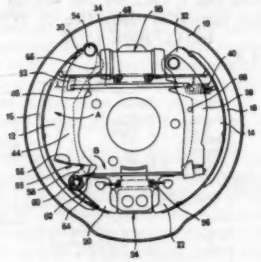
Jean-Jacques Carré, Le Raincy, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Mar. 8, 1982, Ser. No. 355,399

Claims priority, application France, Mar. 31, 1981, 81 06445

Int. Cl.³ F16D *65/52*

U.S. Cl. 188—79.5 P **5 Claims**



1. A drum brake assembly with an automatic brake shoe wear adjustment mechanism responsive to the application of different magnitudes of force applied by actuating means on an adjusting member and coupling means to prevent over-adjustment of brake shoes, comprising: a drum, a support member, a pair of brake shoes mounted on said support member in end-to-end relationship, actuating means disposed between one pair of adjacent shoe ends, anchoring means disposed between the other pair of adjacent shoe ends, an adjusting member pivotally mounted to one of said shoes, said actuating means engaging the end of other shoe and said adjusting member for direct displacement of the adjusting member when the actuating member is actuated, unidirectional coupling means between said one brake shoe and said adjusting member for allowing pivotal movement of said adjusting member in a direction toward the other of said shoes and prohibiting movement in the opposite direction, retraction means for interconnecting and urging said shoes into deactivated position, a strut extending between said brake shoes and having a lost-motion connection with said adjusting member for pivoting said adjusting member upon displacement of said shoes beyond a predetermined amount fixed by said lost-motion connection, said actuating means engaging the adjusting member at a point between the axis of pivotal movement of the adjusting member and a point of engagement of the adjusting member with the strut to render the adjusting member and coupling means operatively responsive to different magnitudes of force exerted thereon by said actuating means, and resilient means between said strut and other shoe, whereby outward displacement of said shoes by said actuating means to engage the shoes with the drum and exceeding said predetermined amount effects pivoting of the adjusting member to adjust the deactivated position of said shoes, and engagement of the actuating means with said adjusting member in cooperation with said resilient means prevents further pivoting of the adjusting member when the shoes experience subsequent outward displacement.

4,502,574

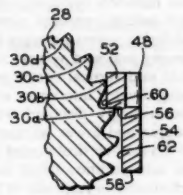
ADJUSTER ASSEMBLY FOR A NONSERVO DRUM BRAKE

Robert Spaargaren, Granger, Ind., assignor to The Bendix Corporation, Southfield, Mich.

Filed Aug. 23, 1982, Ser. No. 410,240

Int. Cl.³ F16D *65/56*

U.S. Cl. 188—79.5 P **4 Claims**



1. An adjuster assembly for a nonservo drum brake wherein a pair of brake shoes are moved by a hydraulic actuator during braking to pivot about an anchor into engagement with a drum, the adjuster assembly including an extendible strut engaging the pair of brake shoes to substantially define a non-braking position, a pawl pivotally carried by one of the pair of brake shoes, a spring extending between the other brake shoe and the pawl, the spring and the pawl cooperating with a star wheel on the extendible strut to control extension of the latter in response to a clearance between the pair of brake shoes and the drum, the star wheel including a plurality of teeth, characterized by said pawl including an arm extending substantially parallel to said extendible strut when braking is terminated, said arm including an offset portion in the direction of said star wheel in order to form a first edge normally cooperating with said plurality of teeth when the clearance results from brake shoe wear, said arm including a flat portion defining a second edge normally spaced from said plurality of teeth, said second edge being engageable with said plurality of teeth when the clearance is excessive, said arm defining a flat surface extending from said second edge to said first edge, said flat surface being engageable with said plurality of teeth when said arm is moved relative to said star wheel during braking and said first edge is indexed from one tooth to a successive tooth, said flat surface permitting said first edge to oppose said successive tooth while said flat surface is engaged with said one tooth, and said flat surface substantially prevents said first edge from engaging a tooth past said successive tooth even though said first tooth is indexed past said successive tooth.

4,502,575

SHOCK ABSORBER

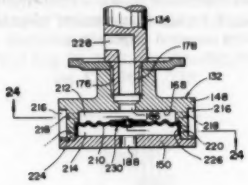
Naoto Fukushima, Fujisawa; Kazuroh Iwata, Kamakura, and Kunihiko Hidaka, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 23, 1981, Ser. No. 285,999

Claims priority, application Japan, Aug. 13, 1980, 55-114598[U]; Aug. 14, 1980, 55-115598[U]; Aug. 14, 1980, 55-115599[U]

Int. Cl.³ F16F 9/34

U.S. Cl. 188—282 9 Claims



1. A hydraulic shock absorber comprising:

a hollow cylinder defining therein a fluid chamber filled with a working fluid;

a piston slidably disposed within said fluid chamber to divide the fluid chamber into upper and lower chambers and having upper and lower members assembled together for defining therein a vortex chamber, said upper and lower members being formed with vertically extending recesses on the outer periphery thereof, said recesses formed in the upper and lower members being aligned with respect to one another and defining vertical vortex passages, said piston further defining vortex passages having inner ends tangentially opening into said vortex chamber and outer ends opening into said vertical vortex passages, said vortex chamber being divided into upper and lower sections with a partition sealingly disposed within said vortex chamber, said upper and lower sections communicating with each other via said vertical vortex passages and said vortex passages, said partition being made of a flexible material and deformable in response to the fluid pressure applied thereto, said partition incorporating a relief valve for relieving the fluid pressure in said vortex chamber whereby the absorbing force produced by said vortex chamber is limited in the ranges of extreme fluid pressure, said relief valve including a pair of apertures formed in said partition and a pair of resilient members fitted on opposite surfaces of the partition, one of said resilient members closing one of said apertures on one of said opposite surfaces of the partition, and the other resilient member closing the other aperture on the other opposite surface, said resilient members providing resilient force serving as a set pressure for the relief valve; and

means for establishing communication between each of said upper and lower chambers and said vortex chamber.

4,502,576

PORTABLE LOCKER

Dennis J. Reardon, 21315 Rumford Dr., Cupertino, Calif. 95014

Filed Dec. 6, 1982, Ser. No. 446,903

Int. Cl.³ A45C 13/00, 13/04; A63B 47/00, 71/00

U.S. Cl. 190—18 R 12 Claims

1. An apparatus for carrying and supporting sports equipment and clothing comprising;

a bag; and

a frame enclosed within said bag, said frame including a loop of rigid material in one plane, said loop having an opposing first and second lateral sides and opposing top and bottom sides, said rigid material frame further including means for supporting said loop, said loop supporting means for extending outwardly from said bottom side of said loop, said supporting means comprising first and second parallel rods and a cross bar rigidly attached to said rods, said cross bar being disposed generally perpendicular to said first and second lateral sides, said cross bar for receiving foot pressure to urge said loop supporting means into soil for mounting said apparatus in a vertical position on a playing field or the like, said apparatus further including tube means adapted to attach between said first rod and said second rod for covering exposed pointed ends of said first rod and said second rod.

4,502,577

CONTROL MECHANISM OF A POWER SHIFT TRANSMISSION

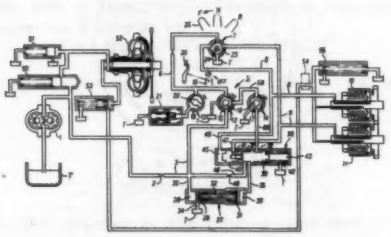
Noboru Nakamichi, Kadoma, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Filed Aug. 5, 1982, Ser. No. 405,703

Claims priority, application Japan, Dec. 28, 1979, 54-171984

Int. Cl.³ B60K 41/28

U.S. Cl. 192—4 A 4 Claims



1. A control mechanism of a power shift transmission arranged in oil passages between a hydraulic pressure source and a hydraulic clutch, comprising an inching valve disposed in an upstream passage of said passages; a selector valve disposed in a downstream passage of said passages; a sequence valve of which an operation chamber is connected to a third passage between the selector valve and the hydraulic clutch; and a modulator valve having a modulation chamber connected to a fourth passage between the pressure source and the selector valve, a drain passage connectable to the modulation chamber, and a booster chamber connected to the sequence valve; said modulator valve being provided with a piston faced to the modulation chamber and operable to open and close the drain passage, a piston faced to the booster chamber, and a compressible coil spring disposed between both pistons; said sequence valve being provided with a spool operable to move in accordance with a pressure in the operation chamber and to alternatively connect the booster chamber to the inching valve

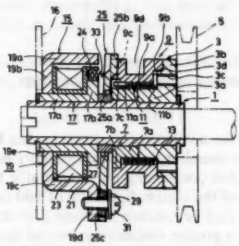
and a passage upstream of the inching valve, so that a hydraulic pressure is always supplied into the booster chamber while the selector valve introduces the pressure into the clutch and the inching valve is operated.

4,502,578

ELECTROMAGNETIC SPRING-WOUND CLUTCH

Kinichi Koyama, Kiryu, Japan, assignor to Ogura Clutch Co., Ltd., Kiryu, Japan

Filed Sep. 22, 1982, Ser. No. 421,480
Claims priority, application Japan, Oct. 2, 1981, 56-157354
Int. Cl.³ F16D *13/02, 13/08*
U.S. Cl. 192—26 **5 Claims**



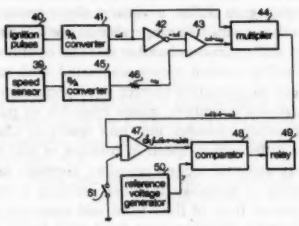
1. An electromagnetic spring-wound clutch comprising:
an output rotary member having a tubular portion and an annular enlarged portion radially outwardly extending from said tubular portion;
an input rotary member concentrically and rotatably fitted on said tubular portion of said output rotary member, said input rotary member having an axial boss disposed adjacent said annular enlarged portion of said output rotary member;
a tubular member disposed concentrically of said output rotary member and said input rotary member and rotatably supported thereby, said tubular member defining an annular space between said tubular member, said annular enlarged portion of said output rotary member and said axial boss of said input rotary member;
first engaging means provided on one end of said tubular member;
a coil spring accommodated within said annular space and wound around said annular enlarged portion of said output rotary member and said axial boss of said input rotary member for gripping engagement with at least the latter, said coil spring having one end engaged by said annular enlarged portion of said output rotary member and another end by said tubular member, respectively, said coil spring being adapted for contraction to grippingly engage at least said axial boss of said input rotary member when said tubular member is freely rotatable, and for expansion as said output rotary member rotates in a predetermined direction when said tubular member is prohibited from rotating;
an armature arranged adajcent said one end of said tubular member;
second engaging means provided on one edge of said armature for engagement with said first engaging means to prohibit rotation of said tubular member;
a field core arranged concentrically with said tubular portion of said output rotary member on a side of said armature remote from said tubular member;
means supporting another edge of said armature radially opposite to said one edge thereof, at a fixed position, said armature supporting means having a radially extending flange formed on said field core and disposed adjacent said another edge of said armature so that said another edge of said armature is directly supported by said field core, at least one through hole formed in said another edge of said armature, at least one bush loosely fitted in said at least one through hole, and means fixing said at least one bush to said radially extending flange of said field core, said armature supporting means being adapted to allow said armature to tilt axially of said output rotary member about said another edge thereof;
elastic means permanently urging said armature in a direction of engagement of said second engaging means with said first engaging means;
a bobbin rigidly fitted in said field core and formed with a housing for receiving said elastic means at a location adjacent said one edge of said armature; and
an electromagnetic coil wound around said bobbin and adapted to generate electomagnetic force when energized, for causing said axial tilting of said armature;
wherein said armature is arranged for displacement against the urging force of said elastic means in another direction of disengagement of said second engaging means from said first engaging means, when said electromagnetic coil is energized; and
during rotation of said input rotary member, said axial tilting of said armature is controlled in dependence upon generation of electromagnetic force by said electromagnetic coil, to cause engagement or disengagement of said second engaging means with said first engaging means, whereby said input rotary member and said output rotary member are drivingly coupled together or disengaged from each other, through said coil spring.

4,502,579

SYSTEM FOR PREVENTING THE OVERHEAT OF A CLUTCH FOR AN INTERNAL COMBUSTION ENGINE

Fujio Makita, Hachioji, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 19, 1982, Ser. No. 350,518
Claims priority, application Japan, Feb. 19, 1981, 56-24081
Int. Cl.³ B60K *41/28*
U.S. Cl. 192—0.052 **10 Claims**



1. A system for preventing overheating of a clutch for an internal combustion engine mounted on a vehicle, the clutch having a drive member secured with a crankshaft of said internal combustion engine and a driven member adjacent to said drive member, heating occurring during slipping of said driven member relative to said drive member, and the vehicle having a transmission secured with said driven member and comprising multi-stage change gears, comprising:
said circuit means for producing a first output signal in proportion to the speed of revolution of said drive member;
second circuit means for producing a second output signal in proportion to the speed of revolution of said driven member;
calculating circuit means including an adder means for subtracting said second output signal from said first output signal and a multiplier means for multiplying a difference of the subtraction by said first output signal;
integrator means for integrating an output of said multiplier;
comparator means for producing a signal when an output of said integrator means exceeds a predetermined value; and
clutch control means for engaging said clutch in dependency

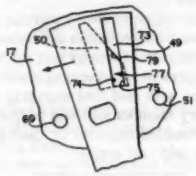
on said signal of said comparator means, so as to prevent overheating of said clutch caused by said slipping.

4,502,580

FLUID COUPLING WITH HYSTERESIS REDUCING VALVE

Stephen M. Clancey, Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 19, 1982, Ser. No. 360,019
Int. Cl.³ F16D *35/00, 43/25*
U.S. Cl. 192—58 B **6 Claims**



1. In a fluid coupling device of the type including a first rotatable coupling assembly, enclosure means associated with said first rotatable coupling assembly to define a fluid chamber therebetween, valve means associated with said first rotatable coupling assembly and disposed to separate said fluid chamber into a fluid operating chamber and a fluid reservoir chamber, a second rotatable coupling member disposed in said fluid operating chamber and being rotatable relative to said first rotatable coupling assembly, said first and second rotatable couplings cooperating to define a viscous shear space therebetween, said valve means being operable to control the flow of fluid between said reservoir chamber and said operating chamber, and including control means associated with said valve means to effect the operation thereof in response to variations in a predetermined condition, means operable to pump fluid from said operating chamber into said reservoir chamber in response to a difference in speed of rotation of said first coupling assembly and said second coupling member, said valve means including a plate-like member defining a fluid inlet disposed to permit flow of fluid from said reservoir chamber into said operating chamber, said fluid inlet being disposed radially inwardly of said viscous shear space, and a movable valve member operably associated with said control means, and with said fluid inlet to control the flow of fluid through said fluid inlet in response to variations in said predetermined condition, said movable valve member comprising a generally flat member disposed to move in a plane generally parallel to said plate-like member, characterized by:

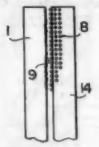
said valve member defining an included open area, the flow area through said valve means being defined by the area of overlap of said fluid inlet and said included open area, said fluid inlet and said included open area being configured such that the radially outermost point of said area of overlap moves radially outward as said valve member moves from a closed position to an open position, wherein said fluid inlet and said included open area are configured such that said flow area is substantially less than the area of said fluid inlet when said valve member is in said open position, to substantially reduce hysteresis as said valve member moves from said open position toward said closed position, one of said fluid inlet and said included open area including an outermost edge which is oriented at an acute angle relative to a radially-extending line.

4,502,581

CLUTCH DISK FOR A CLUTCH AND METHOD OF TREATING A FACING OF A CLUTCH

Hiroshi Komatsu, Hachioji, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1982, Ser. No. 415,766
Claims priority, application Japan, Sep. 8, 1981, 56-141945
Int. Cl.³ F16D *69/02, 13/64*
U.S. Cl. 192—70.14 **10 Claims**



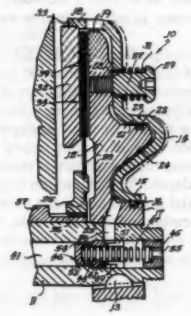
1. A clutch for a vehicle, the clutch having a clutch disk and having an iron member operatively slidably engaging a facing of the clutch disk comprising porous metallic facings provided on both sides of the clutch disk, each of said facings is impregnated with a rust preventive consisting of at least one compound having a greater ionization potential than iron and being reactable with iron under the influence of heat and moisture, such that the compound reacts with the iron to form a rust prevention film on the iron member which acts as an anode as the iron oxidizes to prevent oxidation of the iron member.

4,502,582

WET CLUTCH ASSEMBLY

Thaddeus Lech, Jr., Sterling Heights, and Richard T. Popchock, Lake Orion, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Jun. 28, 1982, Ser. No. 393,222
Int. Cl.³ F16D *25/063, 43/284*
U.S. Cl. 192—85 AA **20 Claims**



1. A hydraulically-actuated starting clutch comprising a piston operatively connected to a rotating shaft, a movable cylinder encompassing and sealingly engaging said piston to provide a pressure cavity therebetween, a friction plate facing said piston opposite to said cylinder and operatively connected to a driven shaft, a pressure plate secured to said cylinder for movement therewith and positioned on the opposite side of the friction plate from the piston, guide means between said piston and cylinder to cause simultaneous rotation thereof, a source of hydraulic fluid pressure actuated by the speed of the rotating shaft to pressurize said pressure cavity, said rotating shaft having a central passage therethrough for the introduction of the hydraulic fluid, said piston having a feed hole communicating between said shaft passage and the pressure cavity, and a

yieldably biased reciprocable control valve received in an enlarged end of said shaft passage and adapted to uncover a side passage communicating with said feed hole at a predetermined pressure level, said control valve having a cylindrical body portion conformably received in said shaft passage, an annular groove in the exterior surface of said body and communicating with longitudinal slots in the rear end, and a reduced diameter nose forming with said passage an annular space adapted to communicate with said piston feed hole.

4,502,583

DRIVE UNIT COMPRISING A MOTOR, A CLUTCH AND A GEAR BOX WITH A SNAP CONNECTION IN THE CLUTCH RELEASE SYSTEM

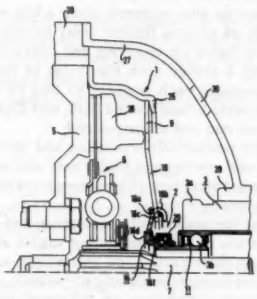
Bernhard Limbacher, Niederwerrn, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Dec. 8, 1982, Ser. No. 448,019

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1981, 3150150

Int. Cl.³ F16D *23/14*

U.S. Cl. 192—98 **8 Claims**



1. A drive unit comprising:

(a) a motor with a motor casing (**28**) and a motor output member (**5**) rotating about an axis of rotation;

(b) a gear box with a gear box casing (**27**) fixed to said motor casing (**28**);

(c) a pulled-type clutch unit for torque transmission between said motor and said gear box, said clutch unit having an axis coaxial with said axis of rotation and including

(aa) a clutch housing (**25**) mounted to said output member (**5**) for rotation about said axis;

(bb) an annular clutch release member (**16**) mounted for common rotation with said clutch housing (**25**) and for axial movement with respect to said clutch housing (**25**);

(cc) a clutch release system (**3**) including

(aaa) a non-rotating clutch release unit (**3***a*) preassembled with said gear box casing (**27**) for axial movement along said axis with respect to said clutch housing (**25**);

(bbb) a release system ring member (**11**) mounted on said non-rotating clutch release unit (**3***a*) by clutch release bearing means (**3***b*) for rotation about said axis and for common axial movement with said non-rotating clutch release unit (**3***a*);

(dd) a releasable locking mechanism (**2**) interconnecting said annular clutch release member (**16**) and said release system ring member (**11**) for common axial movement, said annular clutch release member (**16**) comprising a radially outward sleeve member (**16***f*) and said release system ring member (**11**) comprising a radially inward sleeve member (**11**), said sleeve members (**16***f*), (**11**) being axially coextensive over at least part of their respective axial lengths,

(1) said outward sleeve member (**16***f*) being provided with a plurality of circumferentially distributed slots (**12**), each of said slots (**12**) penetrating through said outward sleeve member (**16***f*) with an angle α of inclination of less than 90° with respect to said axis, said angle diverging towards said motor output member (**5**);

(2) said inward sleeve member (**11**) being provided with an annular groove (**17**) in its radially outer surface (**19**), said annular groove (**17**) being substantially in radial alignment with radial inner ends of said slots (**12**);

(3) roller members (**13**) being provided in said slots (**12**) and engaging said annular groove (**17**);

(4) said roller members (**13**) having terminal portions (**13***a*) extending beyond the radially outer surface (**16***g*) of said outer sleeve member (**16***f*);

(5) a roller engagement ring (**15**) surrounding said outward sleeve member (**16***f*) at a location axially between said roller members (**13**) and said motor output member (**5**), said roller engagement ring (**15**) engaging said terminal portions (**13***a*) of said roller members (**13**) in the axial direction;

(6) spring means (**70**) acting against said roller engagement ring (**15**) such as to urge said roller members (**13**) towards said radially inner ends of said slots (**12**) and—in the locked condition—into engagement with said annular groove (**17**);

(7) the radially outer surface of said inward sleeve member (**11**) comprising a conically shaped terminal section (**18**) urging said roller members (**13**) towards the radially outward ends of said slots (**12**) when said inward sleeve member (**11**) is inserted into said outward sleeve member (**16***f*) before said roller members (**13**) can enter into said annular groove (**17**) such as to axially lock said sleeve members (**16***f*,**11**) with respect to each other;

(8) a locking mechanism release ring (**20**) axially engaging said terminal portions (**13***a*) of said roller members (**13**) on the side remote from said roller engagement ring (**15**); and

(9) an aperture (**30**) being provided in said gear box casing (**27**) in such a position as to grant access to said locking mechanism release ring (**20**) in view of axially shifting said locking mechanism release ring (**20**) against the action of said spring means (**70**).

4,502,584

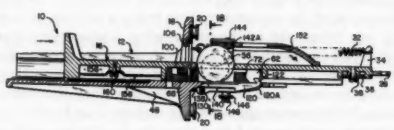
COIN CHUTE ASSEMBLY OPERABLE BY COINS DISPOSED IN A VERTICAL POSITION

Christos Lambiris, New York, N.Y., assignor to Kidde, Inc., Saddle Brook, N.J.

Filed Sep. 30, 1982, Ser. No. 428,532

Int. Cl.³ G07F *5/06*

U.S. Cl. 194—1 G **23 Claims**



1. A coin chute assembly having a housing defining a guide track, and a coin slide reciprocably mounted in said guide track for inserted and retracted movement within said housing, said assembly comprising:

a first inter-engaging set of channels and posts, said posts riding in said channels as said coin slide rides in the guide track of said housing;

a second inter-engaging set of channels and posts positioned inward from said first set of channels and posts, said second set of channels and posts inter-engaging when said coin slide is in its fully inserted position;

a first set of longitudinal rails defining said first set of channels and a second set of longitudinal rails defining said

second set of channels, said first and second sets of rails being substantially parallel to one another;

members of said second set of rails being laterally and longitudinally offset from members of said first set of rails;

members of said first set of channels being laterally and longitudinally offset from members of said second set of channels; and

members of said first set of posts being laterally and longitudinally offset from members of said second set of posts;

said coin slide having a plurality of coin support slots adapted to hold a coin placed therein in a vertical plane, each of said slots being aligned over one of said first channels;

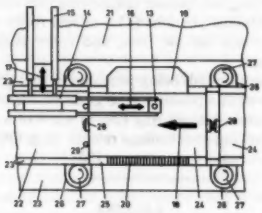
whereby movement of said coin slide in said guide track from a retracted position to an inserted position causes a coin in any one of said coin slots to first ride in a corresponding one of said first channels and then ride on a corresponding one of said second rails.

4,502,585

WORKPIECE CARRIER LOCATING AND CLAMPING MECHANISM FOR ASSEMBLY LINE ARRANGEMENT

Walter Sticht, Wankhamerstrasse 8, A-4800 Attnang-Puchheim, Austria

Continuation-in-part of Ser. No. 891,294, Mar. 29, 1978, abandoned. This application Nov. 7, 1979, Ser. No. 91,984
Claims priority, application Austria, Nov. 13, 1978, 8085/78
Int. Cl.³ B65G *47/00*
U.S. Cl. 198—345 **14 Claims**



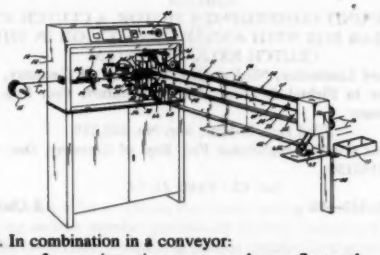
1. In an assembly line arrangement defining a linear conveying path for successive workpiece carriers for a workpiece, which comprises a succession of work stations, each work station having a conveyor section and the conveyor sections of successive ones of the work stations being arranged in series to constitute the linear conveying path, the conveyor section of each work station having a succession of areas each of which accommodates a respective one of the workpiece carriers and at least one of the successive areas being a waiting area and at least one other one of the areas being a processing area for working on the workpiece, and each conveyor section including guide means for vertically and laterally supporting and guiding the successive workpiece carriers along the conveying path and drive means spaced along and separate from the guide means, the drive means being operable for driving each workpiece carrier only through the waiting area of the conveyor section, and means for stopping and securely clamping a respective one of the workpiece carriers in a respective one of the processing areas, the improvement of the stopping means being independent of the clamping means and including a stop operable between a rest position permitting the workpiece carrier to be driven from the one processing area to a successive one of the areas and an arresting position wherein the stop retains the workpiece carrier in the one processing area, the clamping means including a selective stop-defining means affixed to the workpiece carrier and a detent element depressable into engagement with the stop-defining means for accurately locating the workpiece carrier retained in the processing area by the stop in the arresting position thereof.

4,502,586

BELT TYPE CONVEYOR FOR CONVEYING WIRE SEGMENTS

Robert O. Dusel, Brookfield, and Gerald E. Blaha, Waukesha, both of Wis., assignors to Artos Engineering Company, New Berlin, Wis.

Filed Mar. 31, 1982, Ser. No. 363,968
Int. Cl.³ B65G *15/64*
U.S. Cl. 198—345 **11 Claims**



6. In combination in a conveyor:

means for moving wire segments along a first path;

a driven pair of endless flexible belts having engageable confronting flights for receiving and conveying said segments along a second path transverse to said first path while maintaining each segment so that its longitudinal axis is transverse to said second path, said flights comprising an infeed end and an output end;

first means for periodically separating and reclosing a first portion of said confronting flights near said infeed end to facilitate initial reception of a wire segment therebetween for conveyance;

second means for periodically separating and reclosing a second portion of said confronting flights at a location between said first portion and said output end between which a wire segment is already entrapped;

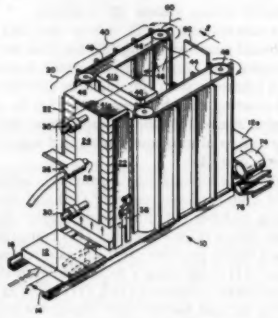
and shifter means for shifting an untrapped wire segment while said second portion of said confronting flights is separated and said untrapped wire segment is free to move.

4,502,587

AUTOMATIC ACCUMULATOR FOR RECTANGULAR ARTICLES

Douglas C. Clark, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Apr. 18, 1983, Ser. No. 486,112
Int. Cl.³ B65G *1/00*
U.S. Cl. 198—347 **3 Claims**



1. An automatic accumulator for articles moving in an indexed stream, which allows a system to continue operation

during interruptions in operation of either a receiving machine or a supplying machine and allows a receiving machine to make up lost production time, comprising:

vertical plunger means, positioned contiguous the path of the indexed stream, for sequentially lifting articles out of the stream;

input magazine means, disposed above said vertical plunger for holding and retaining sequentially lifted articles in a stack;

loading plunger means, adjacent said input magazine means, having powered means for imparting a linear motion to said stack;

bin means positioned adjacent said path of the indexed stream, having one end adjacent said input magazine, having at least one stack bay, and including support means for retaining said stack in vertical position and for moving said stack within said bin means;

output magazine means, adjacent the opposite end of said bin, dimensioned to accept a said stack, having a discharge port formed therein;

discharge plunger means disposed such that the stroke axis thereof passes through the position of the lowermost article in said output magazine and through said discharge port;

output conveyor means disposed to accept articles both from the indexed stream and from said discharge port, said output conveyor means travelling at least twice as fast as the indexed stream; and

control means for regulating the operation of the accumulator.

4,502,588

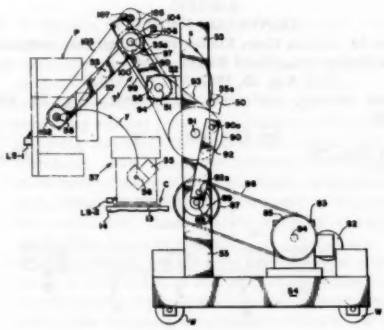
APPARATUS AND METHODS FOR TRANSFERRING NESTED STACKS OF PLASTIC ARTICLES FROM AN ELEVATED CHUTE TO AN UNDERLYING CONVEYOR SURFACE

Robert C. Whiteside, Harrison; Fred L. Greynolds, Beaverton, and Albert W. Arends, Gladwin, all of Mich., assignors to Leesona Corporation, Beaverton, Mich.

Filed Jun. 13, 1983, Ser. No. 503,716

Int. Cl.³ B65G *25/00*

U.S. Cl. 198—409 **15 Claims**



1. Apparatus for transferring generally horizontally disposed rows of stacked plastic articles of disc-like configuration and the like comprising:

a. generally horizontally extending, axially elongate stack support chutes open at the ends thereof to receive and support a nested stack of said articles;

b. stack gripping means comprising axially extending circumferentially spaced members surrounding and defining a tunnel-shaped article receiver;

c. means operating the circumferentially spaced members to cause relative radial contraction, and then expansion, of the receiver;

d. an underlying conveyor surface disposed at a level below said chute;

e. a frame;

f. a transfer arm mounted for swinging movement on said frame and supporting said receiver for movement with the transfer arm, and for relative movement therewith;

g. means for swinging said transfer arm and for moving the receiver relatively thereto, to cause the receiver to travel from a first position horizontally axially aligned with said chute and axially intermeshed therewith in a path having a first horizontally linear increment, then a downward arc, and terminating in a vertically linear path which deposits a stack of articles on said conveyor surface;

h. said means operating the circumferentially spaced members causing radial construction of the receiver when the receiver is in said first position, and expansion when the receiver has moved in said vertically linear path; and

i. motor means for swinging said transfer arm.

4,502,589

METHOD AND APPARATUS FOR THE PRODUCTION OF ROTOR AND STATOR SHEET PACKETS FOR ELECTRICAL MACHINES

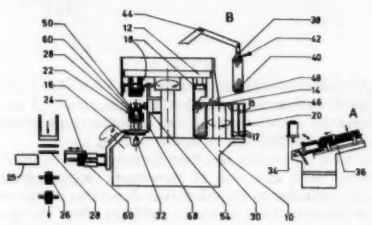
Karl-Heinz Fichtner, Hanau, Fed. Rep. of Germany, assignor to Balzer and Droll KG, Niederdorfelden, Fed. Rep. of Germany

Division of Ser. No. 124,087, Feb. 25, 1980, Pat. No. 4,383,356. This application Sep. 13, 1982, Ser. No. 417,350

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1979, 2907261

Int. Cl.³ B65G *47/84*

U.S. Cl. 198—484 **2 Claims**



1. In an apparatus for making rotor or stator sheet packets, a sheet receiving means comprising a turntable with a plurality of magazine baskets suspended therefrom, connecting means for connecting the baskets to the turntable, each basket having generally vertical wall means, said wall means comprising radially elastically yielding rods which are laterally elastically yieldable to absorb transverse forces exerted by the sheets when an upward force is exerted on the sheets from below, a piston located below the turntable, said piston being movable upwardly through a magazine basket located thereover for urging the sheets upwardly, a head means positioned above the turntable, wherein the laterally, radially yielding rods absorb lateral forces when the piston urges the sheets upwardly, compressing the sheets between the piston and the head means.

4,502,590

CONVEYOR APPARATUS

Charles D. Pole, 16 Revco Dr., Willowdale, Ontario, Canada M2M 2B8

Continuation of Ser. No. 355,351, Mar. 8, 1982, abandoned. This application May 25, 1984, Ser. No. 614,116

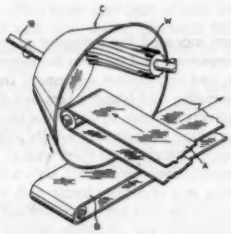
Claims priority, application Canada, Apr. 28, 1981, 376447

Int. Cl.³ B65G *47/58*

U.S. Cl. 198—611 **11 Claims**

2. A method according to claim 1 wherein the freely falling

material is intercepted by the concave working surface below a center of rotation of said concave working surface to restrict



horizontal movement of intercepted material on the concave member to the resultantly horizontal direction.

4,502,591

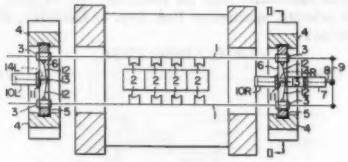
TRANSFER MECHANISM

Hisanori Kato, and Tomio Takagi, both of Nihama, Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Dec. 29, 1981, Ser. No. 335,408

Int. Cl.³ B65G *25/00*

U.S. Cl. 198—621 **13 Claims**



1. A transfer mechanism comprising:

a pair of substantially parallel feed bars,

at least one pair of opposed jaws each jaw being mounted on a corresponding one of said feed bars,

means for supporting said bars for movement in three directions, each direction of movement being substantially perpendicular to the other two directions of movement,

three separate drive means operable to effect cyclic movement of said bars in said three directions, wherein each said drive means comprises at least one hydraulic cylinder having a piston operable to move said bars in one of said directions and at least one cam-operated hydraulic piston pump hydraulically directly connected to said cylinder such that the piston of said cylinder reciprocates in synchronism with the reciprocation of the piston of said cam-operated pump, and

means for driving the cams of said pumps in timed relation to operate said pumps in a predetermined sequence.

4,502,592

APPARATUS FOR INTERMITTENTLY TRANSPORTING STACKS OF PAPER SHEETS OR THE LIKE

Bernd Ramcke, Hamburg, Fed. Rep. of Germany, assignor to E.C.H. Will (GmbH & Co.), Hamburg, Fed. Rep. of Germany

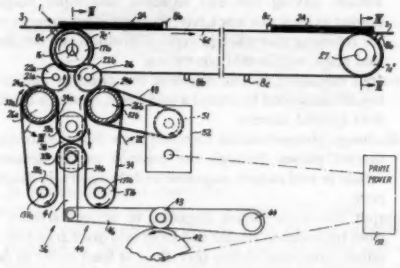
Filed Sep. 13, 1982, Ser. No. 417,662

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1982, 3205157

Int. Cl.³ B65G *15/14*

U.S. Cl. 198—627 **19 Claims**

1. Apparatus for stepwise transport of at least one file of discrete commodities in a predetermined direction and along a predetermined path, particularly for transporting stacks of paper sheets or the like, comprising at least one transporting unit including more than two endless parallel conveyors each having at least one projection arranged to extend into and from said path in response to movement of the respective conveyor in said direction, said conveyors including a first group having at least one conveyor whose projection is located ahead of and a second group having at least one conveyor whose projection is located behind a commodity in said path, said unit further including discrete first and second rotary elements for each of said conveyors and each of said conveyors being trained over the respective rotary elements; and common drive means for said conveyors including a first shaft arranged to drive via first drive transmitting means one rotary element for each conveyor of said first group, a second shaft arranged to drive via second drive transmitting means one rotary element for each



conveyor of said second group, stepping motor means arranged to intermittently rotate said shafts, and transmission means interposed between said motor means and said shafts, said transmission means including means for intermittently changing the angular position of one of said shafts with reference to the other of said shafts to thereby change the spacing between the projection of each conveyor in one of said groups and the projection of each conveyor in the other of said groups so that the spacing is larger as said projections receive or discharge said commodities and the spacing is smaller during conveyance of said commodities between the reception or discharge zones at which the commodities are received by or discharged from between said projections.

4,502,593

CONVEYOR FACILITY

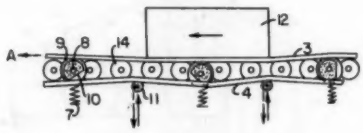
Jakobus M. van den Goor, Eindhoven, Netherlands, assignor to Lear Siegler, Inc., Grand Rapids, Mich.

Filed Aug. 23, 1982, Ser. No. 410,369

Claims priority, application Netherlands, Aug. 26, 1981, 8103958

Int. Cl.³ B65G *13/06*

U.S. Cl. 198—781 **2 Claims**



1. A conveyor facility comprising:

a frame defining an article transportation surface;

an endless flexible drive element continuously movable during operation, said drive element including upper and lower parts oriented generally parallel to said article support surface;

a plurality of control elements each rotatably supported on a shaft between said upper and lower parts of said drive element, resilient means individually supporting each of

said control elements for vertical movement in response to changes in conveyor operation between transport and accumulation each of said control elements including a first circumferential part concentric with said shaft and a second circumferential part at a shorter distance from said shaft than said first circumferential part; and

lift means beneath the lower part, the lift means being normally lowered to retracted position and responsive to removal of an article movement restraint for selectively and temporarily shifting said lower part of said continuously movable drive element upwardly into engagement with said first circumferential parts of said control elements when said control elements are stationary and the restraint is removed to cause said control elements to rotate, said lift means lowering said lower part to disengage said control element when their rotation has been reinstated.

4,502,594

SUPPORT FOR A SIDE GUIDE OF A CONVEYING DEVICE

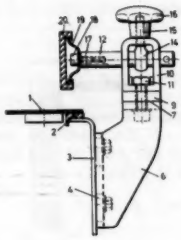
George Sijbrandij, Poeldijk, Netherlands, assignor to Gefra B.V., Gravenzande, Netherlands

Filed Sep. 10, 1981, Ser. No. 301,017

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1980, 3035371

Int. Cl.³ B65G *21/10*

U.S. Cl. 198—836 **1 Claim**



1. A support for a side guide of a horizontal conveying device comprising:

an attaching member which is attached to the conveying device;

a horizontal mounting pin;

a supporting member for mounting said mounting pin to said attaching member, said supporting member including a clampable guide means for allowing free longitudinal movement of said mounting pin when unclamped and for preventing any longitudinal movement of said mounting pin when clamped and a screw knob for clamping and unclamping said guide means;

a pivot connection for allowing free rotational adjustment about a vertical axis of said supporting member and said mounting pin relative to said attaching member, said pivot connection including a chockable vertical screw for frictionally holding said pivot connection immovably after adjustment;

a connection member for connecting the side guide to said mounting pin, said connection member being pivotable about a vertical axis; and

a removable insert member of a selected vertical height provided between said attaching member and said supporting member for spacing said supporting member and hence said mounting pin from said attaching member such that the side guide is accurately vertically positioned relative to the particular conveyor device.

4,502,595

CONVEYING AND LIKE STRUCTURES

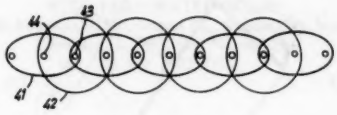
John B. Wheeldon, Blackburn, England, assignor to Scapa-Porritt Limited, Blackburn, England

Continuation of Ser. No. 141,300, Apr. 18, 1980, abandoned. This application Jan. 20, 1983, Ser. No. 459,484

Claims priority, application United Kingdom, Apr. 21, 1979, 7913962; May 5, 1979, 7915733

Int. Cl.³ B65G *17/06*

U.S. Cl. 198—853 **7 Claims**



1. A link conveyor comprising: a base structure defined by a respective plurality of spirals of a synthetic plastics material hingedly connected together in parallel interdigitated disposition to provide a conveyor having adequate strength in the running direction thereof, and a supplementary structure likewise comprising a respective plurality of spirals arranged together in parallel interdigitated disposition and constituting a coherent whole with the base structure, the supplementary structure being coextensive with the said base structure in the longitudinal direction thereof and the spirals of said supplementary structure being of increased abrasion resistance in relation to those of the base structure and extending outwardly of the base structure at each face thereof to protect the base structure against wear at those surfaces.

4,502,596

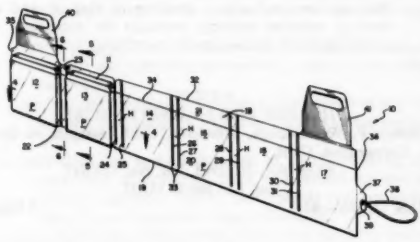
GAME CARTRIDGE DISPLAY AND CARRIER PACK

Raymond L. Saetre, Rte. 1, Box 143, Bangor, Wis. 54614, and Robert S. Saetre, Rte. 2, Box 841, Astoria, Oreg. 97103

Filed Dec. 2, 1983, Ser. No. 557,485

Int. Cl.³ B65D *85/672*

U.S. Cl. 206—387 **9 Claims**



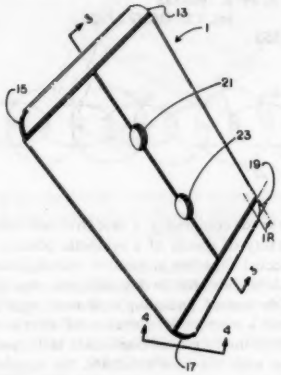
1. A display and storage pack comprising a flexible, sheet-form material having front and rear walls forming a plurality of pockets in side-by-side adjacency, the pockets and the walls being connected together vertically at side edges of the pockets for selected accordian-folding, the pockets further being adapted to receive rectangular solids therein for display and storage, wherein the flexible sheet-form material is formed with pairs of evenly spaced-apart vertical seam edges located between and defining sides of adjacent ones of said pockets, and wherein lower ends of the vertical seam edges are normally spaced above the bottoms of the pockets on the sheet-form material by approximately half the thickness of said rectangular solids.

4,502,597

SHIPPING PALLET

Bryant W. Cantey, P.O. Box 8998, Greenville, S.C. 29604

Filed May 16, 1983, Ser. No. 495,114
Int. Cl.³ B65D *85/02, 85/66*
U.S. Cl. 206—392 **3 Claims**



1. A shipping pallet for use during shipping a plurality of the similarly shaped articles, comprising:

a generally rectangular backing member having arcuate corners formed of a single sheet of corrugated material, folded double along each edge of said single sheet toward the center of said single sheet whereby there are four folds merging to form an "I" shaped juncture of edges of said single sheet all within the perimeter of said backing member whereby said backing member comprises two thicknesses of corrugated material, with a majority of edges of said backing member being of folded corrugated material, with only said arcuate corners comprising severed corrugated material;

wherein the radius of the arc of said each arcuate corner being small in relation to the length of any edge of said backing member and wherein the folds of two opposing sides of said single sheet are of a length of substantially equal to said radius;

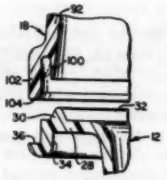
said backing member defining at least two passagways therethrough for mechanized handling of thereof, and said backing member defining openings for receipt of and containment of article support members.

4,502,598

HOLDER FOR MAGNETIC DISKS

Robert P. Wartenbergh, Woodside, Calif., assignor to Dysan Corporation, Calif.

Filed Nov. 20, 1981, Ser. No. 323,647
Int. Cl.³ B65D *85/02*
U.S. Cl. 206—444 **5 Claims**



1. A holder for magnetic disks comprising:

a base having a central post secured thereto and extending upwardly therefrom, the post adapted to receive and to permit stacking a number of magnetic disks thereon in generally parallel, horizontal planes; and

a cover movable into an operable position over the post and into covering relationship to the disks and the post, the cover having a top portion and an outer peripheral wall portion extending downwardly from said top portion and terminating in a first peripheral sealing region,

said base having an outer peripheral wall portion terminating in a second peripheral sealing region;

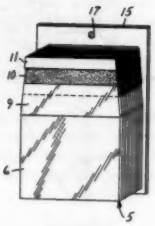
each of said first and second peripheral sealing regions having an outer rim portion located for mutual engagement therebetween when the cover is in said operative position; and each of said first and second peripheral sealing regions having an integral annular projection spaced from and located inside the corresponding rim portion and having inclined surfaces positioned for mutual engagement when said cover is in said operative position, one of annular projections being resilient so that said resilient projection will flex to cause said mutual engagement and thereby provide a peripheral seal within the region of mutual engagement between the outer rim portions.

4,502,599

PACKAGE AND METHOD OF PACKAGING RESEALABLE PLASTIC BAGS

Jack L. Perecman, Golden Valley, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 2, 1984, Ser. No. 595,593
Int. Cl.³ B65D *85/62, 33/20*
U.S. Cl. 206—554 **6 Claims**



1. A package of polymeric bags each comprising an envelope and pressure-sensitive adhesive means adhered to the envelope for sealing the envelope, said adhesive means being placed on the opened envelope to expose a strip of pressure sensitive adhesive, comprising

a plurality of said polymeric bags placed open in a stack with the strip of pressure-sensitive adhesive of each bag aligned, and with the strip of pressure-sensitive adhesive on one bag being in contact with the surface of the next bag in the stack opposite the exposed strip of pressure-sensitive adhesive of said next bag, and

a support adhered to the back surface of the bottom bag of the stack.

4,502,600

RECLOSABLE CARTON WITH INTERIOR TAB AND BLANK THEREFOR

George P. Webinger, Robbinsdale, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed Feb. 1, 1983, Ser. No. 462,759
Int. Cl.³ B65D *5/70*
U.S. Cl. 206—626 **2 Claims**

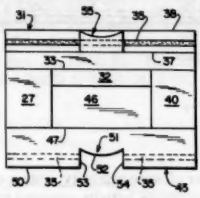
1. A paperboard carton having a tubular body portion, comprising:

means for closing a first end of the tubular body portion, and first and second overlapping and initially glued end panels

hingedly coupled to the tubular body portion at the second end of the tubular body portion to close the second end,

a straight distal edge and a line of glue substantially parallel thereto substantially completely across the width of the first end panel, and

a distal edge formed on the second end panel on the opposite side of the panel from where the panel is coupled to the body, and



means intermediate said distal edge defining a tab in the interior of the second end panel, said tab facing towards the distal edge of the second end panel and being pivotable out of the plane containing the second end panel,

after separating said overlapped and glued end panels to open said carton, said straight distal edge on the first end panel being insertable under said tab and over the portions of the second end panel on opposite sides of said tab for interlocking the first and second end panels and reclosing the second end of the tubular body portion.

4,502,601

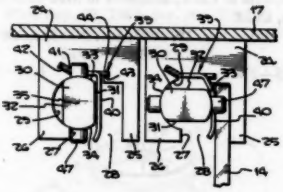
LOW FRICTION INSERTION FORCE RETAINER

Martin D. Husted, Van Nuys, and Norman J. Schuster, Woodland Hills, both of Calif., assignors to International Electronic Research Corp., Burbank, Calif.

Filed Oct. 18, 1982, Ser. No. 434,742

Int. Cl.³ A44B *21/00*

U.S. Cl. 211—41 **25 Claims**



1. A low insertion force retainer for gripping relatively flat edge portions comprising a housing incorporating elongated racks for engagement with respective edge portions, each rack comprising a flange extending lengthwise of the rack for retention of said edge portion, a clamp assembly extending lengthwise of the rack and in spaced relationship with said flange whereby to provide a slot of breadth in excess of the thickness of said edge portion for reception of said edge portion, said clamp assembly comprising a rod member, said rack having an elongated pocket adjacent said slot for retention of said rod member in a position for rotation about an axis of rotation, at least one clearance face on said rod member at a fixed distance from the axis of rotation whereby when said clearance face is in an initial position facing said flange the distance between said clearance face and said flange is in excess of the thickness of said relatively flat edge portion, a camming surface on said rod member adjacent said clearance face at a distance from the axis of rotation greater than the distance between said clearance face and the axis of rotation whereby when the rod member is in a position of rotation removed from said initial position said camming surface will have a camming action against said edge portion for retention of said edge portion in the slot, said rod member having a relatively lesser thickness in a direction normal to said clearance face which is smaller than the breadth of said slot, whereby to enable lateral insertion and removal of said rod from said pocket.

4,502,602

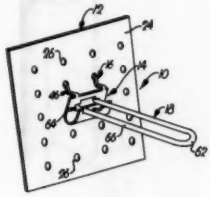
DISPLAY FIXTURE WITH REMOVABLE ARM FOR USE WITH PERFORATED BOARD

Russell K. Swanson, 3212 Coleman Rd., Kansas City, Mo. 64111

Filed Aug. 4, 1982, Ser. No. 405,290

Int. Cl.³ A47F *7/00*

U.S. Cl. 211—59.1 **8 Claims**



1. A display fixture for mounting on a perforated upright support surface having opposed front and rear faces, and structure defining a series of perforations extending between said front and rear faces, said fixture comprising:

(a) a base structure for attachment to said upright support surface, including

a body of generally U-shaped cross-sectional configuration with respect to a vertical axis presenting a rearward portion, and a spaced, opposed forward portion;

structure defining an aperture extending through said rearward portion of said base; and

structure defining at least one indentation in said forward portion of said base;

(b) means for attaching said base to said perforated upright support structure and including a plurality of spaced-apart, surface-engaging fastener members for insertion into corresponding perforations, each of said fastener members having a first leg, a second leg, a third leg, and a fourth leg connected by a series of generally right angle bends,

said first leg adjoining the rear face of said upright support surface and extending upward from said corresponding perforation,

said second leg being connected to the bottom of said first leg and extending through said corresponding perforation,

said third leg being connected to said second leg and extending downwardly from said second leg and adjoining said front face of said upright support surface beneath said corresponding perforation,

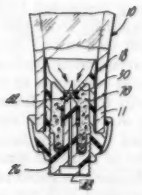
said fourth leg being connected to said third leg and extending outwardly from said front face of said upright support surface in a generally horizontal fashion, the outer end of said fourth leg being connected to the rearward portion of said base structure, said rearward portion being obliquely oriented relative to said fourth leg and in engagement with the front face of said upright support surface at a point below the fourth leg;

(c) an elongated arm structure having at least one support member each with a terminal section of generally L-shaped configuration at one end thereof, each of said terminal sections being received within said base aperture for releasably securing said terminal sections to the base structure, said arm extending outwardly from the base structure and being received within said indentation for supporting the arm structure.

4,502,603
FEEDING BOTTLE
Shen-Kuang Hsu, 6-1, La. 168, Chi Lin Rd., Taipei, Taiwan
Filed Jan. 31, 1984, Ser. No. 575,645
Int. Cl.³ A61J 9/00
U.S. Cl. 215—11 C 1 Claim

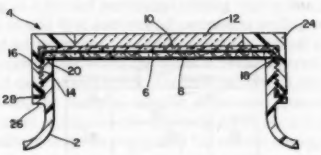
1. A feeding bottle comprising:
a container provided with threads at its upper portion;
a collar threadedly engaged with said threads of said container;
a mouthpiece fixedly attached to said collar; and
a cap mounted on the top of said collar, said cap having threads engageable with the bottom of said collar;
whereby said cap is used as a container when engaged with the bottom of said collar thereby enabling said feeding bottle to be used as two feeding bottles of different volumes.

4,502,604
CHAMBERED BOTTLE CAP
Don Martus, 38235 Hazel Rd., Mt. Clemens, Mich. 48045
Filed Aug. 8, 1983, Ser. No. 520,995
Int. Cl.³ B65D 1/04
U.S. Cl. 215—206 22 Claims



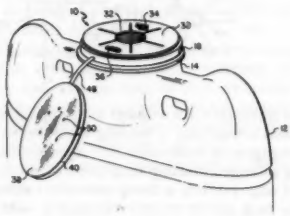
1. A closure for closing the neck of a bottle comprising:
a tubular housing defining a chamber having one end open for fluid communication with the interior of the bottle;
first means for selectively closing said one end of said chamber;
second means for closing the other end of said chamber; and
third means on said housing for sealing the housing against the neck of said bottle to seal the bottle.

4,502,605
CONTAINER CLOSURE INTEGRITY SYSTEM
Donald R. Wloszczyna, West Islip, N.Y., assignor to Denerik Creativity, Inc., West Islip, N.Y.
Filed Jun. 29, 1984, Ser. No. 626,180
Int. Cl.³ B65D 55/02
U.S. Cl. 215—230 15 Claims



1. In a container closure integrity system comprising a container having an aperture initially covered by an impermeable seal and a cap adapted removably to be placed over said aperture, so that an inner cap surface is superposed in relation to said seal, the improvement comprising a two component indicator dye/activator combination and a cap with a transparent portion, wherein a first component of the indicator dye/activator combination is mounted proximate said interior cap surface and is at least partially visible through said transparent cap portion, and the second component of the indicator dye/activator combination is mounted proximate the outer surface of said impermeable seal, with means sealingly to enclose the two components in a liquid phase between the cap inner surface and seal outer surface wherein, further, the indicator dye component comprises a first absorbent medium having an indicator dye portion which exhibits a color that is a function of the pH of an associated activator solution, and said activator component comprises a second absorbent medium permeated by a volatile alkali solution, having a pH in the range of 9–12.

4,502,606
LOCKING CLOSURE FOR DISPOSABLE CONTAINERS
Richard A. Shillington, San Clemente, and Alec Oberschmidt, Leucadio, both of Calif., assignors to Med-Safe Systems, Inc., Leucadia, Calif.
Filed Sep. 19, 1983, Ser. No. 533,608
Int. Cl.³ B65D 41/18
U.S. Cl. 215—274 9 Claims



1. A permanent locking closure structure for a container, comprising:
annular wall structure defining an opening for a container, said wall structure having a stepped outer diameter defining a generally tubular neck, and end portion defining a circular opening and having a first outer diameter, an adjacent sleeve portion defining a second outer diameter greater than said first diameter, and a radial annular shoulder separating said end portion and said sleeve portion, said end portion including a radially outwardly extending annular locking ridge,
a non-removable closure defined by a generally flat circular

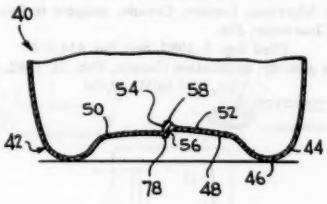
disk having an axially extending peripheral skirt, a radially inwardly extending annular locking ridge on the interior of said skirt for forceably enaging over said outwardly extending annular locking ridge, said skirt having a radial annular face for tight engagement with said shoulder, and an outer diameter equal to or less than said second outer diameter.

4,502,607

BULGE RESISTANT BOTTLE BOTTOM

John L. Szajna, Norridge, Ill., assignor to Continental Plastic Containers, Inc., Stamford, Conn.

Filed Jun. 21, 1983, Ser. No. 506,472
Int. Cl.³ B65D *6/34, 8/04, 8/06, 8/08*
U.S. Cl. 220—70 **14 Claims**



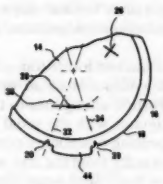
1. A bottom construction of a blow molded plastic container, said bottom construction comprising an outer reversely turned portion and an inner axially recessed portion, said inner portion including opposed halves integrally joined together with said opposed halves being axially offset to define a stepped bottom part having an axial rib extending across said bottom and forming a reinforcement for said inner axially recessed portion to prevent inversion of said inner portion from its axially recessed position.

4,502,608

DISPOSABLE LID FOR DRINKING CUPS

Kenneth Mills, 1521 Grand Blvd., Oakville, Ontario, Canada L6H 3E4

Filed Sep. 22, 1983, Ser. No. 534,758
Claims priority, application Canada, May 16, 1983, 428249
Int. Cl.³ B65D *41/48*
U.S. Cl. 220—90.4 **11 Claims**



1. A disposable lid for a drinking cup having a generally circular mouth with a lip, said lid being formed of frangible and tearable material of relatively thin cross-section compared to the diameter of said lid and adapted to fit over said lip, and comprising:

a generally circular cavity formed around the periphery of said lid and of a cross-sectional dimension so as to fit snugly over said lip when said lip is received in said cavity;

a generally planar central portion inwardly of said cavity; and

a skirt portion depending downwardly and outwardly from said cavity and terminating at an outer rim where at least one pair of cuts is made in said skirt portion at said rim through the thickness thereof, said rim cuts being spaced apart from each other a distance less than 25 percent of the circumference of said rim;

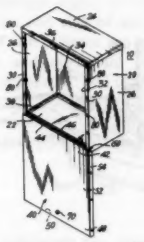
and where a second cut is made in said central portion through the thickness thereof in a place radially inwardly from said cavity at a distance less than the radius of said lid, said second cut having a length so as to extend at least between imaginary diameters drawn through said rim cuts.

4,502,609

SLIDING AND PIVOTED CLOSURE FOR A LOCK BOX

Jerry P. Christatos, 344 Slocum Way, Fort Lee, N.J. 07024

Filed Mar. 15, 1984, Ser. No. 589,896
Int. Cl.³ B65D *43/06*
U.S. Cl. 220—329 **12 Claims**



1. An enclosure for electrical components comprising:

an open faced housing for receiving the electrical components, including inwardly extending and generally opposing side flange sections;

a cover for closing the open housing face, including top, bottom, and side ends, the top end having an inwardly extending flange, each side end having a slot dimensioned for slidable and pivotal engagement with the side housing flange sections, such that the cover may be positioned in overlying relation with respect to the open face of the housing; and

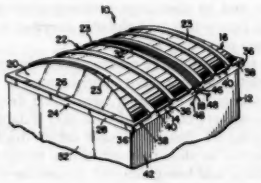
safety means for locking the cover at spaced positions on the side housing flanges, said safety means engaging automatically when the cover is oriented in a generally parallel relation to said side housing flanges and caused to move downward a spaced distance from a position overlying and enclosing the open housing face, said safety means disengaging when the cover is pivoted at said cover slots.

4,502,610

HOPPER COVER

Dale Todd, Michigan, N. Dak., assignor to Bert Moore Sales, Inc., Redwood Falls, Minn.

Filed Jan. 23, 1984, Ser. No. 572,887
Int. Cl.³ B65D *43/20*
U.S. Cl. 220—346 **6 Claims**



1. A cover for a hopper of an agricultural implement, comprising:

a pair of covering members;

means for moving each of said covering members toward and away from the other;

first and second means for stopping movement of each of said covering members in both directions, respectively; and

means for holding said covering members together including means for mating together said covering members at adjoining edges.

4,502,611

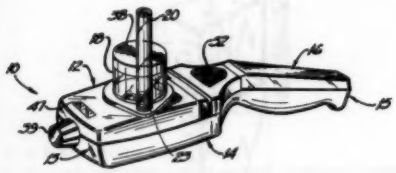
AMALGAM DISPENSING DEVICE

Peter A. Basile, Hudson, Ohio, and William J. Blatherwick, Hamilton Square, N.J., assignors to Johnson & Johnson Dental Products Company, East Windsor, N.J.

Filed Feb. 7, 1983, Ser. No. 464,794

Int. Cl.³ G01F *11/16*

U.S. Cl. 221—93 **7 Claims**



1. A device for storing and dispensing metered amounts of mercury and amalgamable metal in tablet form, which comprises:

(a) an elongated housing having an upper portion, a front end, and a lower portion containing a main discharge port;

(b) a normally closed mercury reservoir extending upwardly from said upper portion, said reservoir including a mercury discharge port at the bottom thereof;

(c) a tablet container extending upwardly from said upper portion, said container containing a tablet discharge port at the bottom thereof;

(d) an elongated passageway disposed longitudinally within said housing, a portion of said passageway being directed below said mercury discharge port and another portion of said passageway being directly above said main discharge port, said passageway being adapted to receive a snugly fitting slidable member therein, said slidable member being adapted to slide within said passageway between a first, normally closed position and a second position;

(e) venting means including a vent passage communicating at one end directly with the interior of the mercury reservoir near the top thereof, and at the other end with said elongated passageway when said slidable member is in a position other than said first position, but wherein said vent passage is sealed from said elongated passageway when said slidable member is in said first position;

(f) a memory metering cavity having a predetermined volume within said slidable member adapted to receive from said mercury reservoir through said memory discharge port when said slidable member is in one of said two positions, and to discharge mercury through said main discharge port when said slidable member is in the other of said two positions; and

(g) slidable tablet discharge means comprising plate containing a tablet receiving cavity and located in said housing beneath said tablet container, said tablet discharge means being operatively connected with said slidable member to slide in concert therewith, said tablet discharge means being adapted to slide between a first position and a second position, and being adapted to receive a single tablet from said tablet container when the tablet discharge means is at one of said two positions and to discharge said single tablet into said main discharge port when said tablet discharge means is in the other of said two positions,

whereby said mercury reservoir is closed to the atmosphere when said slidable member is in said first position and said mercury reservoir is vented by admission of air to the upper portion of the interior of the mercury reservoir when said slidable member is moved away from said first position, and whereby when said slidable member is moved from said first position to said second position and back again, a predetermined volume of mercury and one tablet are discharged from said main discharge port,

wherein said slidable member is moved by moving a slide button that is coupled to said slidable member by two parallel slidable rods that pass through said housing and which couple to said slidable member by coupling means located near the front end of said device.

4,502,612

DISPENSING CONTAINER

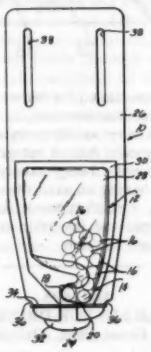
David E. Morrison, London, Canada, assignor to Saxon Arms, Inc., Clearwater, Fla.

Filed Sep. 3, 1982, Ser. No. 414,878

Claims priority, application Canada, Feb. 23, 1982, 396797

Int. Cl.³ B65D *83/04*

U.S. Cl. 221—185 **9 Claims**



1. A dispensing container comprising:

a hollow body for storing articles;

a curvilinear throat forming a continuous hollow extension of the body depending from the body when the body is oriented in an operative vertical dispensing position, the throat having a cross-section proximate the cross-section of the articles

the throat having an end and lower trap portion adjacent the end, the end being disposed at an upwardly extending serial alignment portion contiguous to the hollow body, a trap portion contiguous with the serial alignment portion and an article dispensing positioning portion contiguous to and extending upwardly from the trap portion in the same plane as the hollow body at an acute angle with respect to the trap portion such that only one article at a time moves to the article dispensing position from the trap, the throat further having an outlet aperture contiguous to the article dispensing positioning portion; and

a closure member mounted at the outlet aperture for movement between a first position closing the outlet aperture and a second position opening the outlet aperture.

9. A dispensing container comprising:

a elongated planar member;

a cover member having an internal cavity and an elongated channel portion depending from the internal cavity terminating in an upturned end;

the cover member being affixed to the planar member to define a hollow body and a depending continuous throat;

the throat having an upturned end defining a lower trap portion adjacent the end which permits only one article at

a time to be moved to the end of the throat, the throat having an outlet aperture formed at the end thereof;

a closure member pivotally connected to the planar member at one end adjacent the outlet aperture in the throat for movement between a first position closing the outlet aperture and a second position opening the outlet aperture; and

means, mounted on the planar member and engaging the closure member, for biasing the closure member to the first position closing the outlet aperture.

4,502,613

EXTRUDER FOR CONTENTS IN TUBE CONTAINERS

Ken Yamamoto, 22-5 4 chome, Nishisakado, Saitama Ken, Japan

Filed Oct. 27, 1982, Ser. No. 437,024
Int. Cl.³ B65D *35/28*
U.S. Cl. 222—103 **6 Claims**

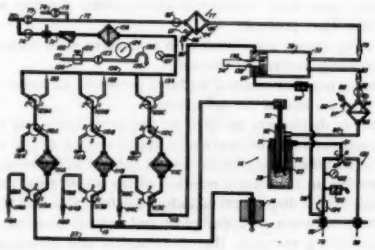
1. An extruder for dispensing contents from a tubular container comprising; a pair of extruding members connected at one end by a hinge; engagement means at the other end of said extruding members constructed to engage and close said extruding members; said extruding members being constructed to form a pair of openings on opopsite sides and extending between said ends; said extruding members when closed constructed to provide a path between said pair of openings; one of said extruding members having an opening above said path for receiving a lever means having an L-shaped cross-section; said lever being pivotally mounted in end walls of said one extruding member at opposite ends of said opening above said path; said lever means constructed to press down on a tubular container positioned in said path between said pair of openings thereby locking the position of the tubular container.

4,502,614

STERILIZING APPARATUS FOR AN ENCAPSULATING MACHINE

Gerhard H. Weiler, South Barrington; Paul A. Anderson, Arlington Heights, and Louis T. Pagels, Hanover Park, all of Ill., assignors to Automatic Liquid Packaging, Inc., Arlington Heights, Ill.

Division of Ser. No. 222,358, Jan. 5, 1981, Pat. No. 4,353,398. This application Sep. 13, 1982, Ser. No. 417,533
Int. Cl.³ B67D *5/46*
U.S. Cl. 222—148 **2 Claims**



1. In a liquid packaging system having (1) a metering device that includes a cylinder, a piston rod with an end disposed in said cylinder, and a shifting piston connected to said rod end and slidably disposed in said cylinder; said piston having a pressurizing side and an oppositely facing piston rod side that is connected to said piston rod; said metering device having a dosing chamber defined by said cylinder and said piston pressurizing side and (2) a source of sterilizing agent communicating with the piston rod side of said piston; a system for preventing the entry of contaminants into the piston rod side of said metering device cylinder, said system comprising:

(a) valve means communicating with said cylinder on said piston rod side of said metering device for passing flow of said sterilizing agent out of said cylinder on said piston rod side of said piston whereby, upon the application of sterilizing agent from said source to said cylinder at said piston rod side of said piston and upon the opening of said valve means, said agent flows through said cylinder on said piston rod side of said piston thereby sterilizing said piston rod side of said cylinder; and

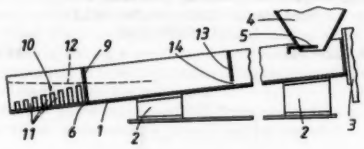
(b) means for furnishing a supply of filtered gas under pressure to said piston rod side of said cylinder after said piston rod side of said cylinder has been sterilized by said sterilizing agent and after said valve means is shut whereby the gas supplied to said cylinder flows out of said cylinder around said piston rod thereby precluding the entry of the contaminants into said cylinder and dosing chamber around said piston rod and piston after sterilization.

4,502,615

APPARATUS FOR A CONTROLLED SUPPLY OF POWDER TO A MOLD FOR CONTINUOUS CASTING

Kurt Stangl, Seewalchen, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Sep. 7, 1982, Ser. No. 415,484
Claims priority, application Austria, Oct. 5, 1981, 4246/81
Int. Cl.³ B65G *27/100*
U.S. Cl. 222—199 **6 Claims**

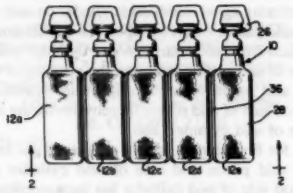


1. In an apparatus for a controlled supply of a powder to a mold for continuous casting, the mold having a predetermined cross section and the apparatus comprising an inclined vibrating conveyor adapted to receive said powder at an upper region thereof and operable to convey said powder in a predetermined direction of conveyance to a lower delivery edge conforming to the cross section of the mold, the improvement comprising a retaining wall carried by said vibrating conveyor, the retaining wall extending along said delivery edge and defining a flow control gap therewith, the retaining wall having sections thereof oriented differently with respect to said predetermined direction and causing the powder to pile up thereat and to exert a conveying pressure on the powder flowing through the gap, which pressure varies at different retaining wall sections depending upon the orientation of the sections, and the flow control gap having a height varying in inverse relation to the conveying pressure.

4,502,616
SINGLE USE VIAL

Eugene J. Meierhoefer, Hackettstown, N.J., assignor to Health Care Concepts, Inc., Allamuchy, N.J.

Filed Jan. 4, 1982, Ser. No. 337,080
Int. Cl.[3] B67D 5/56; B65D 35/08
U.S. Cl. 222—215 2 Claims



1. In a single use, non-reclosable vial having a squeezable closed body, an intermediate neck and an initially closed dispensing nozzle, said vial containing a medicated or non-medicated solution to be administered to a patient for respiratory therapy; the improvement which comprises:

(a) said nozzle having a circular cross-section and a diameter sized to fit snugly in the medication port of a Bird nebulizer and into the inner solution-receiving port of standard tracheal and endotracheal devices;

(b) said neck including a cylindrical flange having a diameter larger than the medication port of a Bird nebulizer;

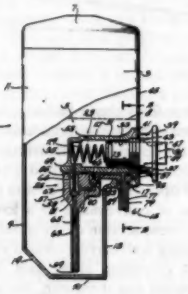
(c) said cylindrical flange being connected to the lower substantially cylindrical portion of said neck adjacent the body of said vial by an intermediate transition channel of reduced diameter; and

(d) said lower substantially cylindrical portion of the neck having a circular cross-section and a diameter larger than said reduced diameter and such that it fits snugly within the internal diameter of standard tracheal and endotracheal devices.

4,502,617
FLAVOR DECANTER AND PUMP

Earl M. Stecker, Kiel, and Richard C. Plamann, Appleton, both of Wis., assignors to Stoelting, Inc., Kiel, Wis.

Filed Jan. 31, 1983, Ser. No. 462,160
Int. Cl.[3] B67D 5/40
U.S. Cl. 222—385 10 Claims



1. A decanter and pump assembly for dispensing quantities of liquid comprising:

a. an open reservoir for holding the liquid;

b. a cover for covering the reservoir;

c. a metering device removably mountable to the interior of the reservoir and operable from outside the reservoir for pumping a predetermined quantity of liquid from the reservoir;

d. a valve arrangement detachably attached to the reservoir and the metering device in operable relationship thereto for controlling the flow of the liquid from inside the reservoir to outside the reservoir; and

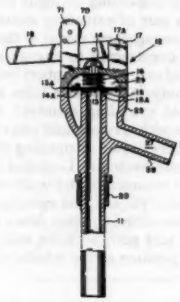
e. a fastener extending through a first opening in the reservoir and fastenable from outside the reservoir to engage the metering device and to provide the sole means for locking the metering device to the interior of the reservoir, the fastener having a longitudinal bore extending therethrough,

so that upon unfastening the fastener from the metering device completely unlocks the metering device and valve arrangement from the reservoir.

4,502,618
CLOSURE DEVICE FOR CONTAINERS OF VOLATILE LIQUIDS

Hugh M. Bushell, Post Office, Wyandra, Australia 4489

Filed Jan. 26, 1982, Ser. No. 342,928
Claims priority, application Australia, Feb. 2, 1981, PE7438
Int. Cl.[3] B65D 83/14
U.S. Cl. 222—396 12 Claims



1. A closure device for a container containing volatile liquid and attachable to said container, said closure device including a valve assembly comprising:

a valve body;

a tubular valve seat contained within said valve body;

a valve chamber surrounding said tubular valve seat;

a discharge passage communicating with said valve chamber;

valve stem means associated with biasing means movable in said valve body between a valve closed position and a valve open position;

actuating means associated with said valve stem means for actuating movement thereof;

a sealing member retained within a groove in an upper horizontal surface of the valve seat;

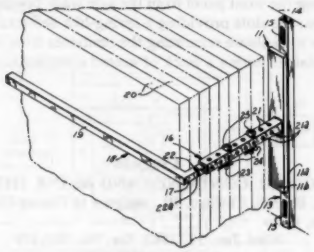
a flexible diaphragm retained by the valve body and interposed between the horizontal upper surface of the valve seat and the biasing means and in contact with the sealing member in the closed position of the valve stem means, said flexible diaphragm including a deformable sheet interposed between an upper plate and bottom plate of rigid reinforcing material, the construction and arrangement being such that in the closed position the combination of said sealing member and said flexible diaphragm prevents access to the valve chamber from volatile material in the container and in the open position said volatile material is discharged through said discharge passage.

4,502,619

PLYWOOD SAFETY BAR

Charles R. Cox, 917 Rex St., Louisville, Colo. 80027

Filed Jan. 26, 1984, Ser. No. 574,175
Int. Cl.³ B60P 7/08
U.S. Cl. 224—311 1 Claim



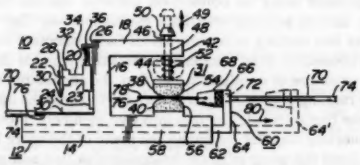
1. A plywood safety bar device, comprising, in combination, a metal channel member fixedly mounted vertically on an inner side of a wall of a semi-trailer vehicle, and a separate metal bar unit removably mounted along a front side of said channel member; said bar unit comprising a vertically elongated mounting plate, a tubular sleeve of cross-sectionally square configuration, rigidly welded at its one end to a front side of said mounting plate, and extending horizontally forwardly therefrom, and an "L"-shaped bar having a first leg thereof adjustably received within an opposite end of said tubular sleeve; a plurality of spaced-apart rectangular cut-out openings along said channel member, and a plurality of downwardly extending hooks projecting on a rear side of said mounting plate, for being removably received in said cut-out openings, said bar being of cross-sectionally square configuration throughout both legs thereof, a plurality of equally spaced-apart transverse openings through said tubular sleeve and said bar first leg, for selective alignment, and a pair of clevis pins removably received through selective aligned said openings for locking said bar to said sleeve, said transverse openings comprising a row of vertical holes and a row of horizontal holes in said tubular sleeve and said bar, whereby a plurality of plywood panels may be supported upright between said vehicle wall and a second of said bar legs extending around either a side or top edge of said panels.

4,502,620

METHOD AND MEANS FOR SEVERING AN OPTICAL FIBER

John J. Leiby, Reading, Pa., assignor to TRW Inc., Redondo Beach, Calif.

Filed Aug. 19, 1983, Ser. No. 524,753
Int. Cl.³ C03B 37/16
U.S. Cl. 225—2 38 Claims



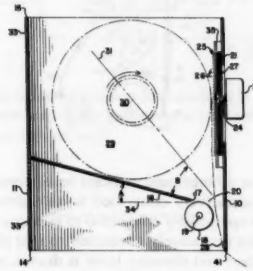
1. A method of severing an optical fiber comprising the steps of (a) inflicting a flaw on the glass surface of an optical glass fiber to be severed, (b) contacting an area about the fiber for applying pressure thereto which compresses the fiber, and (c) moving the contacted area along the fiber while applying sufficient pressure to produce frictional force which severs the fiber as the contacted area moves over the flaw.

4,502,621

PAPER DISPENSING APPARATUS

Richard E. Thatcher, 10709 Lunswood Rd., Chester, Va. 23831

Filed Mar. 30, 1983, Ser. No. 480,256
Int. Cl.³ B26F 3/02; B65H 35/10
U.S. Cl. 225—16 11 Claims



1. Apparatus for dispensing paper tissue from a spirally wound roll on a hollow core comprising:

(a) holding means for functionally supporting and positioning said roll comprised of two opposed side retaining members, a front panel adapted to be vertically oriented and a floor having a forward extremity adjacent said front panel, said floor being substantially perpendicularly disposed to said side retaining members which are spaced apart sufficiently to accommodate therebetween said roll supported by said floor in a manner such that said core is horizontally disposed,

(b) an opening within said holding means associated with the forward extremity of said floor in perpendicular orientation to said side retaining members and adapted to permit passage therethrough of paper from said roll, and

(c) carding material slideably supported by said holding means and adapted for reciprocal motion in a linear path, said carding material being adapted to advance the paper of said roll when moved in one direction, and not move the paper when moved in the reverse direction, said carding material having a length such as to cause contact with the paper roll at both extremities of its reciprocal motion at all diameters of the paper roll,

(d) whereby paper can be moved from said roll at a rate controlled by the motion of said carding material.

4,502,622

LEVER MEANS IN A TAG ATTACHING APPARATUS

Duck H. Lee, Minyong Apartment, Block "Q", Room No. 606, 301-112, Ichon-dong, Yongsan-Ku, Seoul, Rep. of Korea

Filed Dec. 7, 1982, Ser. No. 447,633
Int. Cl.³ B25C 1/00
U.S. Cl. 227—67 1 Claim

1. A tag attaching apparatus comprising:

(a) a body having a lower part for manipulation by the user and an upper part which contains the tag attaching components of the apparatus;

(b) a guide home formed in the upper part of said body;

(c) a slider disposed in said guide home;

(d) a pushing pole operatively connected to said slider;

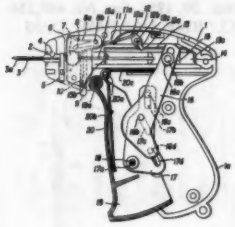
(e) a needle slidably disposed in the upper part of said body adjacent said pushing pole;

(f) manually actuable drive means disposed in the lower part of said body and operatively connected to said slider, said drive means being pivotably mounted on a pivot which

goes through the middle of said drive means and which is mounted in the lower part of said body;

(g) a drawing lever pivotably mounted on the upper part of said body; and

(h) an assistant lever pivotably mounted on said drawing



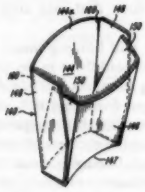
lever about a hinge, said assistant lever containing a central slot operatively connected to said drive means, an upper slot operatively connected to said drive means, and a lower slot operatively connected to said drive means, whereby, when said drawing lever is drawn, said hinge on said assistant lever moves.

4,502,623

PRECISE VOLUME, DISPOSABLE FOOD CONTAINER

Franklin Moore, Jr., 902 McBarney Dr., Lebanon, Ohio 45036, and Clinton Fultz, 508 Preston Dr., Waynesville, Ohio 45068

Filed Aug. 4, 1982, Ser. No. 405,073
Int. Cl.³ B65D 5/18
U.S. Cl. 229—1.5 B **2 Claims**



1. A disposable open top container for collecting and serving a food product and adapted to be used in a fast-food establishment, the container comprising:

a unitary piece of paper-like material including a front panel and a back panel connected by a bottom panel,

the front panel having a projecting lip portion with an upwardly curved upper edge to form a scoop and the back panel having a downwardly curved upper edge,

a pair of opposed side walls connected to the front panel and projecting therefrom at substantially right angles,

a pair of opposed side walls connected to the back panel and projecting therefrom at substantially right angles,

each of the side walls projecting from one of the panels having a first edge portion and a second edge portion forming an obtuse angle therebetween, the first edge portions of the side walls having a length generally equal to the spacing between the front and back panels adjacent the bottom panel and engaging the other of the panels for precisely spacing the back panel with respect to the front panel to determine the volumetric capacity of the container, the second edge portions of the side walls diverging from the one panel towards the plane of the other panel,

the side walls projecting from the other panel overlapping the side walls projecting from the one panel and being adhesively attached thereto to fix the relative positions of the panels,

each of the side walls projecting from the other panel having an edge portion diverging from the one panel towards the plane of the other panel,

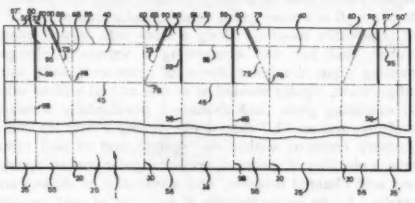
the front panel having a pair of slots extending from the open top on opposite ends of the lip portion and partially separating the front panel from the side walls projecting therefrom, the slots providing a spring-like deflectable lip portion to facilitate separating the container from an adjacent container within a stack of nested containers.

4,502,624

OCTAGONAL CONTAINER AND BLANK THEREFOR

David E. Burrell, Chicago, Ill., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jun. 13, 1983, Ser. No. 503,479
Int. Cl.³ B65D 5/08
U.S. Cl. 229—41 C **10 Claims**



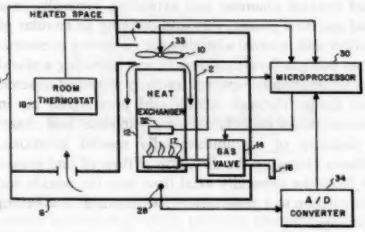
1. An integral blank of foldable material for forming a polygonal shaped container, the blank comprising a plurality of generally rectangular side, end, and connecting panels connected together by score lines to define pairs of side panels and end panels, each side panel and end panel separated by one of the connecting panels, the panels being adapted to fold into an octagonal shaped container, there being corresponding closure flaps attached to each of the panels including a pair of opposed generally rectangular side closure flaps hingeably connected to alternate side panels, each side flap having a width substantially equal to the width of its associated side panel, a pair of opposed generally rectangular end closure flaps hingeably connected to associated end panels, each end flap being located in alternate arrangement to each side flap around the octagonal periphery, a pair of opposed connecting closure flaps hingeably connected to the associated connecting panels, there being four connecting flaps whereby there is a connecting flap between each side flap and each end flap, the connecting flap being generally rectangular and hingeably connected to the top of its associated connecting panel, one edge of each connecting flap hingeably connected to an edge of its adjacent side flap, there being no connection between the the connecting flap and its adjacent end flap, the connecting flap having a score line starting at one corner of the connecting flap where it is connected to its associated connecting panel at the edge of the score line of its adjacent side flap, the connecting flap score line running generally from the corner towards the outer edges of the flap to divide the flap into two members, there being a connecting flap slot following the plane of the score line starting from the outer edge of the connecting flap and going in a direction toward the corner, the connecting flap, when the blank is folded to form a closure, providing the connecting flap slot for receiving the outer edge of its adjacent end flap to secure the same in a folded position, each end flap being held in the folded position by the connecting flap slot formed at each outer edge of the connecting flaps.

4,502,625

FURNACE CONTROL APPARATUS HAVING A CIRCULATOR FAILURE DETECTION CIRCUIT FOR A DOWNFLOW FURNACE

Dale A. Mueller, New Hope, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 31, 1983, Ser. No. 528,294
Int. Cl.[3] F24D 5/10
U.S. Cl. 236—11 20 Claims



1. A furnace control apparatus comprising
fuel combustion means for heating a heating medium,
a furnace fuel supply valve arranged to supply fuel to said combustion means,
valve control means for controlling the actuation of said valve to control the flow of fuel therethrough,
circulator means for supplying the heating medium from the furnace after heating by said combustion means by inducing a flow of the heating medium counter to a temperature induced flow of the heating medium produced by said combustion means,
temperature measuring means for sensing the temperature of the heating medium supplied from the furnace by said circulator means and producing an output signal representative of the sensed temperature and
logic means responsive to an energization of the circulator means and the output signal from the temperature measuring means for controlling said valve control means initially to admit fuel to said combustion means during a start-up of the furnace and subsequently to interrupt the flow of fuel through said valve when the temperature of the heating medium fails to reach a first reference temperature after a predetermined time period following the energization of the circulator means.

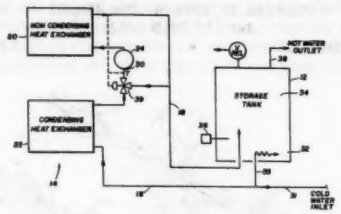
4,502,626

COMBUSTION PRODUCT CONDENSING WATER HEATER

Joseph Gerstmann, Framingham, and Andrew D. Vasilakis, Bedford, both of Mass., assignors to Gas Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 150,289, May 16, 1980, Pat. No. 4,403,572. This application Dec. 8, 1982, Ser. No. 448,033
Int. Cl.[3] F23N 1/08
U.S. Cl. 236—20 R 10 Claims

1. A water heating assembly comprising:
a generally cylindrical housing;
a fuel burner within the housing at about the center axis of the housing;
a primary heat exchanger coil within the housing, surrounding the fuel burner, coaxial with the housing, the coil being closed at each end such that combustion gas from the burner flow radially therethrough;
a combustion gas impermeable baffle within the housing, coaxial with the housing, surrounding and spaced from the primary heat exchanger the space between the primary heat exchanger and the baffle being closed at one end to axially direct combustion gas from the primary heat exchanger coil to the opposite end of the baffle; and
a second heat exchanger coil within the housing connected in series with the primary heat exchanger coil, coaxial with the housing, surrounding the baffle such that combustion gas from the primary heat exchanger flows around said opposite end of the baffle and axially past the secondary heat exchanger coil.

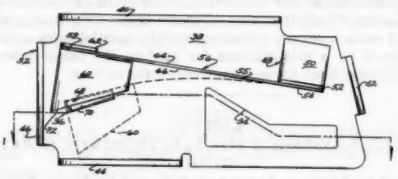


4,502,627

FLUID FLOW CONTROL APPARATUS

Henry Ty, Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 29, 1983, Ser. No. 518,493
Int. Cl.[3] G05D 23/08
U.S. Cl. 236—93 R 15 Claims

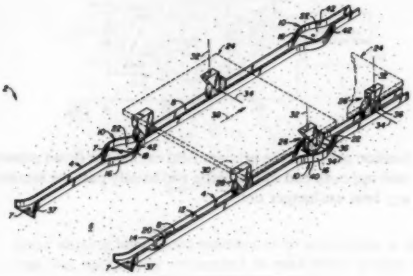


1. A fluid flow control comprising a body having a valve chamber and having a fluid passageway leading to and from the valve chamber, a base plate disposed in the valve chamber and adapted to separate the chamber into two portions with the fluid passageway leading to one of the portions and leading from the other of the portions, a first control orifice formed in the base plate permitting fluid flow through the passageway, a second control orifice formed in the base plate to permit additional fluid flow through the passageway, the second orifice being in the form of an elongated slot having a length and a width with the length substantially greater than the width, the slot having first and second edges extending generally in the direction of the length, a flag disposed on the base plate and adapted to slide over the second orifice, a thermostat element having two ends, one end mounted on the base plate, the other end mounting the flag, the other end of the thermostat element movable in an arc as the temperature of the thermostatic element changes, the flag having an edge movable into alignment with the first edge of the slot at a first selected temperature with the second orifice fully covered by the flag and the second edge of the slot at a second selected temperature with the second orifice fully uncovered by the flag so that the flag will slide over the surface of base plate defining the second orifice as the temperature changes thereby controlling relatively large orifice area with little angular movement of the thermostat element.

4,502,628
CART TRACK

Anthony Sarantitis, Pacifica, Calif., assignor to Palcon Corporation, San Francisco, Calif.

Filed Jan. 17, 1983, Ser. No. 458,385
Int. Cl.³ E01B 5/02
U.S. Cl. 238—122 **3 Claims**



1. A track assembly, for use with carts having castor wheels pivotable about generally vertical axes, for guiding the carts over a surface comprising:

first and second parallel tracks mounted to the surface;

said first and second tracks each including first and second main segments and first and second transition segments connecting said main segments;

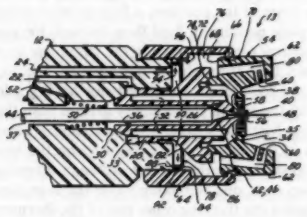
said first and second transition segments sized to permit the castor wheels to pivot 180° about the generally vertical axes to avoid movement of the castor wheels backward along the track, said first and second transition segments positioned so that not more than one of the cart wheels are in any of said transition segments at the same time; and

said main segments including upright parallel sides spaced apart by a first distance for guiding the castor wheels therebetween for movement over the surface.

4,502,629
NOZZLE ASSEMBLY FOR ELECTROSTATIC SPRAY GUNS

Edward C. McGhee, Amherst, and Harold D. Beam, Kipton, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Jan. 18, 1983, Ser. No. 458,911
Int. Cl.³ B05B 5/02
U.S. Cl. 239—3 **7 Claims**



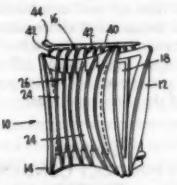
1. In an electrostatic spray coating apparatus adapted to be connected to a source of liquid coating material for providing relatively low liquid coating material flow rates in the approximate range of less than about three fluid ounces of material per minute said apparatus including a nozzle having an orifice from which liquid coating material is emitted in the form of an atomized spray, means for electrostatically charging the liquid coating material emitted from said orifice, and fan-shaping means for impinging the atomized spray of liquid coating material emitted from said orifice with pressurized air to form a fan-shaping pattern of said atomized liquid coating material, said fan-shaping means including a gas flow passageway for delivering pressurized air to an internal chamber generally axially of said nozzle and opposed exit ports communicating with said chamber through which said pressurized air passes to form the fan-shaped pattern, the improvement comprising:

an annular diffuser located in said chamber having a circumferential flange lying radialiy outwardly of the location where said gas flow passageway delivers pressurized air to said internal chamber and extending generally axially of said gas flow passageway and defining an annular plenum within said internal chamber for receiving pressurized air from said gas flow passageway and including a plurality of circumferentially spaced, radially directed openings in said flange through which said pressurized air in said plenum passes radially outwardly to enter said chamber at a plurality of circumferentially spaced locations, said diffuser changing the direction of flow of said pressurized air from the generally axial flow into the nozzle and into said plenum to a generally radial outward flow exiting said openings.

4,502,630
VAPOR-DISPENSING DEVICE

Brian D. Haworth, Farnborough, England, and Edward J. Malek, Racine County, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Jun. 13, 1983, Ser. No. 503,958
Int. Cl.³ A61L 9/12
U.S. Cl. 239—34 **13 Claims**



1. A device for dispensing air-treating vapors comprising:

two support members having facing, substantially parallel support surfaces and having first and second pairs of aligned edges along opposite ends of the support surfaces, at least one of such support surfaces being a grate;

a flexible, generally flat dispenser sandwiched between the support surfaces and having an inner storage container of vaporizable air-treating composition which is burstable by sandwiching pressure exerted through the support surfaces to release the composition for dispensing;

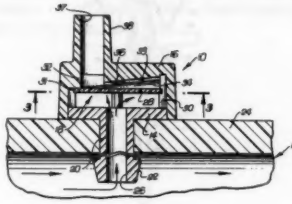
means along said first pair of aligned edges interconnecting said support members; and

a spacer member interconnecting said support members along said second pair of aligned edges and maintaining said support surfaces at a first spacing such that the inner storage container cannot be burst, said spacer member being removable to allow application of sandwiching pressure on said inner storage container through said support surfaces and said flexible dispenser to burst said storage container.

4,502,631
TRICKLE IRRIGATION UNIT

Hans D. Christen, La Verne, Calif., assignor to Rain Bird Sprinkler Mfg. Corp., Glendora, Calif.

Filed Mar. 24, 1983, Ser. No. 478,369
Int. Cl.[3] F16K 7/12; A01G 25/00
U.S. Cl. 239—106 10 Claims



1. A trickle irrigation unit, comprising:

a housing having an internal pressure chamber, an inlet for communicating a supply of water under pressure to said pressure chamber, an outlet port at one side of said pressure chamber remote from said inlet, and a recessed flow path formed in said housing at said one side of said pressure chamber to intersect said outlet port; and

a resilient valve member within said housing to overlie said outlet port and to cooperate with said recessed flow path to define a flow passage from said pressure chamber to said outlet port, said valve member being deformable into said outlet port and recessed flow path in response to the pressure within said pressure chamber to vary the cross-sectional area of the flow passage in a manner permitting a relatively high flow to said outlet port when said pressure is relatively low and a substantially reduced flow when said pressure is relatively high;

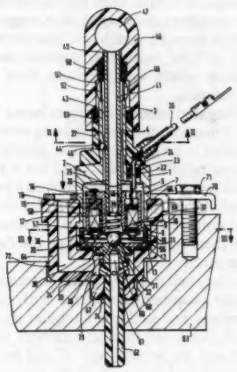
said outlet port having a generally oblong configuration with a length and width sufficient to pass grit and the like when said pressure is relatively low and a width sufficiently narrow to prevent pressure-responsive deformation of said valve member into said outlet port from significantly obstructing the flow passage when said pressure is relatively high.

4,502,632
ELECTROMAGNETICALLY ACTUATABLE VALVE, IN PARTICULAR A FUEL INJECTION VALVE FOR FUEL INJECTION SYSTEMS

Udo Hafner, Lorch; Waldemar Hans, Bamberg; Rudolf Krauss, Stuttgart, and Rudolf Sauer, Benningen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 320,813, Nov. 12, 1981, abandoned.
This application Dec. 6, 1983, Ser. No. 558,568
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1980, 3046890
Int. Cl.[3] F02M 69/04, 51/08; F16K 31/06
U.S. Cl. 239—125 7 Claims

1. An electromagnetically actuatable valve, in particular a fuel injection valve for fuel injection systems of internal combustion engines, said valve having an axis and encompassed by a housing including a wall, a magnetic coil mounted on a core having a predetermined length and constructed of ferromagnetic material, an armature firmly connected with a valve element arranged to cooperate with a fixed valve seat and guided by means of a guide diaphragm clamped to said housing at its outer circumference, a first tubular fuel fitting concentrically disposed relative to said valve axis and a second tubular fuel fitting coaxially disposed inside said first fuel fitting whereby a flow conduit for the fuel is formed between said first and said second fuel fitting, said valve housing being an inverted cup forming a chamber the bottom of which extends transversely of said axis, said second fuel fitting having a portion spaced from said valve element, a compression spring interposed between said portion and said valve element biasing the latter into engagement with said valve seat, the biasing force of said spring being adjustable by axial displacement of said second fuel fitting, said first fuel fitting extending axially of said cup bottom exteriorly thereof, said flow conduit having an end remote from said valve seat which communicates with a

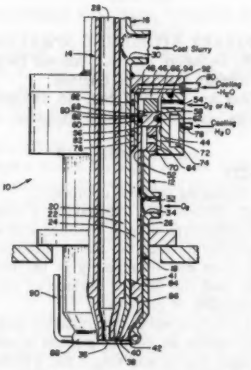


first fuel line and said second fuel fitting communicating with a second fuel line, said second fuel fitting protruding through said cup bottom into said core and said flow conduit terminating at said cup bottom of said valve housing and communicating with said chamber of said valve housing, which chamber surrounds said magnetic coil and with it forms an annular gap, by means of which a flow connection for the fuel between the flow conduit and the second fuel fitting is provided.

4,502,633
VARIABLE CAPACITY GASIFICATION BURNER

Daniel I. Saxon, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 5, 1982, Ser. No. 439,479
Int. Cl.[3] C10J 3/48
U.S. Cl. 239—132.3 8 Claims



1. A variable capacity gasification burner comprising

an outer elongated tubular shell having upstream and downstream ends and being statically sealed against the atmo-

sphere outside the shell when the downstream end is positioned in the intended operating environment, and

a plurality of elongated concentric tubular members positioned concentrically within said outer tubular shell and being spaced therefrom and from each other to define along and therebetween and with said outer elongated tubular shell channels along which reactants may flow, said tubular members also having upstream and downstream ends;

said outer elongated tubular shell and said elongated concentric tubular members defining at their respective upstream ends openings through which said reactants may be introduced, and at their respective downstream ends nozzle openings from which said reactants flow and come together for reaction;

one of said elongated tubular members being adapted when the burner is in said intended operating environment to be slidably moved in an axial direction parallel to the axis of the concentric tubular members and the wall of its nozzle opening thus being adapted to be moved toward and away from the wall of one of the outer tubular shell and tubular members to constrict and open up the nozzle opening to the channel therebetween to regulate the flow velocity of reactant therefrom;

said outer tubular shell defining at its upstream end one wall of an annular chamber concentric with said concentric tubular members and said outer tubular shell;

another of said elongated tubular members also defining at its upstream end the second wall of said annular chamber spaced opposite said one wall of the annular chamber;

said slidably movable elongated tubular member at its upstream end also defining an annular piston adapted to be slidably moved axially within said annular chamber;

said outer tubular shell also defining first and second conduit openings through which one of said reactants may be introduced to the portion of the annular chamber on said one side of said annular piston and one of said reactants or an inert gas may be introduced to the portion of the annular chamber on the other side of the annular piston to move the annular piston in one direction or the other depending upon the difference in pressure between the two sides of the annular piston;

said annular piston having means for limiting the extent of axial movement of the annular piston in either direction and having means for providing a dynamic seal between the annular piston and the walls of the annular chamber to prevent flow of said one reactant from the portion of the annular chamber on one side of the annular piston to the portion of the annular chamber on the other side of the annular piston.

4,502,634

ROTARY ATOMIZING SPRAYER

Edward J. Bals, Delamere House, Tedstone Delamere, Bromyard, Herefordshire HR7 4PS, England

Filed Apr. 27, 1983, Ser. No. 489,088

Claims priority, application United Kingdom, Apr. 28, 1982, 8212333

Int. Cl.³ B05B *3/10*

U.S. Cl. 239—223 **8 Claims**

1. A rotary atomizing sprayer, comprising:

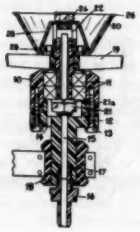
a rotary part, formed as a cup having a base, an internal surface, a peripheral edge at its open end and a hollow spigot extending through the center of the base, the spigot having an open end terminating in the interior of said rotary part and the interior surface of the rotary part having a plurality of grooves;

an apertured rotary member, provided on said open end of said spigot, having an interior portion in communication with said open end of said spigot and a closed end;

a liquid supply tube, extending through said spigot, having first and second ends, said first end being located within said interior portion of said apertured rotary member;

a rotary distributor secured to the closed end of and surrounding the apertured rotary member, having a divergent circular internal surface; and

a rotor member provided on the portion of the hollow spigot extending from the exterior of the rotary part, so that a rotation of the rotor member causes a rotation of the spigot and thus the rotary part, the apertured rotary member and the rotary distributor, and so that liquid supplied from the supply tube passes through the apertures of the apertured rotary member to the internal surface of the rotary distributor then to the internal surface of the rotary part and subsequently flows along the grooves in the rotary part to the peripheral edge of the rotary part where it is discharged.



4,502,635

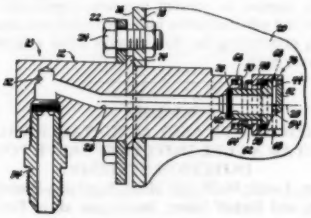
FUEL INJECTION NOZZLE WITH AUTO-ROTATING TIP

Edward D. Klomp, Mt. Clemens, and Walter Cornelius, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 13, 1982, Ser. No. 417,080

Int. Cl.³ B05B *3/06*

U.S. Cl. 239—251 **6 Claims**



1. In a nozzle for injecting fuel into a combustion zone maintained at a zone pressure above atmospheric, the combination comprising, a source of combustible fuel at a supply pressure exceeding said zone pressure, a stationary nozzle body having a main fuel passage means of predetermined flow area in communication with said fuel source and aligned on an axis of said nozzle body, means on said nozzle body defining a stationary annular seal flange around said passage means in a plane perpendicular to said axis, an auto-rotating tip disposed on said nozzle body around said seal flange for rotation about said axis and cooperating with said nozzle body in defining a distribution cavity in communication with said passage means so that pressurized fuel in said distribution cavity urges separation between said nozzle body and said auto-rotating tip, means defining an inturned annular flange on said auto-rotating tip disposed on the opposite side of said seal flange from said distribution cavity so that pressurized fuel in said distribution cavity urges said inturned flange toward said seal flange, means defining a plurality of equal sized fuel passages in said auto-rotating tip communicating with said distribution cavity

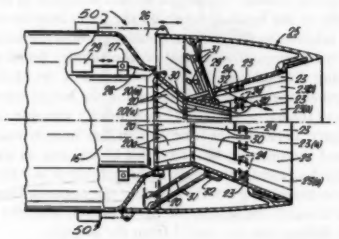
and having combined flow areas less than said predetermined flow area so that a high velocity jet of fuel issues from each of said fuel passages when pressurized fuel is present in said distribution cavity, each of said high velocity jets producing a reaction force on said auto-rotating tip having a component directed tangent to a circle about said axis so that said high velocity jets spin said tip whereby fuel is dispersed in a volume of revolution about said axis, and means defining a rubbing seal between said inturned flange and said seal flange operative to prevent escape of pressurized fuel therebetween from said distribution cavity.

4,502,636

VARIABLE GEOMETRY EJECTOR NOZZLE FOR TURBOMACHINES

Douglas J. Nightingale, Atlanta, and Gary F. Szuminski, Marietta, both of Ga., assignors to Rolls-Royce Inc., New York, N.Y.

Filed Apr. 7, 1982, Ser. No. 366,389
Int. Cl.³ F02K *1/12, 1/09, 1/28*
U.S. Cl. 239—265.17 **5 Claims**



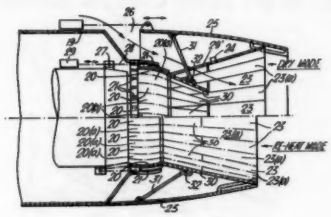
1. A nozzle for a gas turbine aeroengine comprising spaced inner and outer ducts, one or more air inlet openings located at the downstream end of the outer duct, a movable shroud extending downstream of the outer duct, a circumferential array of first flaps each of which is pivotally attached to the inner duct, a circumferential array of second flaps each of which is pivotally attached to the downstream end of one of the first flaps and in slidable contact at its downstream end with the shroud, a plurality of the second flaps being provided with an opening therein and a door in each opening, each of the doors being pivotally attached at its upstream end to a region adjacent the upstream end of the second flaps, a plurality of links each of which is pivotally attached at one end to the shroud and pivotally attached at its other end to one of the doors, a first actuation means operable on the first flaps to rotate them in unison about their pivotal attachments to the inner duct thereby to define a convergent throat of the nozzle and simultaneously move the upstream ends of the second flaps, and a second actuation means operable on the shroud to move the shroud to and from a first position, where the shroud obturates the said inlet opening or openings, to and from a second position, downstream of the first position, where the shroud uncovers the said inlet opening or openings, and simultaneously causes the said links to push the doors open to form a mixer region downstream of the throat whereby air entering the air inlet opening or openings and the openings in the second flaps intermixes with hot gases flowing through the throat of the nozzle.

4,502,637

TURBOMACHINE EJECTOR NOZZLE WITH THRUST REVERSER

Douglas J. Nightingale, Atlanta, Ga., assignor to Rolls-Royce Inc., New York, N.Y.

Filed Jun. 7, 1982, Ser. No. 386,188
Int. Cl.³ F02K *1/12, 1/09, 1/28*
U.S. Cl. 239—265.17 **6 Claims**



1. A nozzle for a gas turbine aero-engine comprising spaced inner and outer ducts, one or more air inlet openings located at the downstream end of the outer duct, a movable shroud extending downstream of the outer duct, a plurality of first flaps each of which is constrained to move along a curved path, a plurality of second flaps each of which is pivotally attached to the downstream end of one of the first flaps at least some of the second flaps being provided with an opening therein and a door in each opening, each door being pivotally attached at its upstream end to a region adjacent the upstream end of the second flaps, a plurality of links each of which is pivotally attached at one end to the shroud and pivotally attached at its other end to a door, a first actuation means operable on the first flaps to translate them in unison along the curved path thereby to define a convergent throat of the nozzle and simultaneously move the upstream ends of the second flaps, and a second actuation means operable on the shroud to move the shroud to and from a first position, where the shroud obturates the said inlet opening or openings, to and from a second position, downstream of the first position, where the shroud uncovers the said inlet opening or openings, alters the position of the second flaps and simultaneously causes the said links to push the doors open thereby to form a mixer region downstream of the throat whereby air entering the air inlet opening or openings and the openings in the second flaps intermixes with hot gases flowing through the throat of the nozzle.

4,502,638

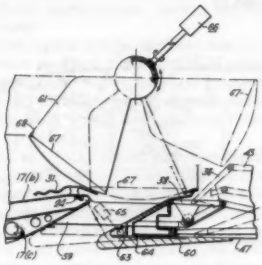
TURBOMACHINE EJECTOR NOZZLE AND THRUST REVERSER

Gary F. Szuminski, Marietta; Douglas J. Nightingale, Atlanta, and Robert F. Tape, Marietta, all of Ga., assignors to Rolls-Royce Inc., New York, N.Y.

Filed Apr. 26, 1982, Ser. No. 372,015
Int. Cl.³ F02K *1/12, 1/38, 1/60*
U.S. Cl. 239—265.29 **10 Claims**

1. An exhaust nozzle for a gas turbine engine comprising a duct and a mechanism for varying the geometry and area of the nozzle, which mechanism includes a plurality of movable flaps which in at least one position define a convergent part of the nozzle, wherein there is provided upstream of the flaps at least two outwardly directed openings in the wall of the duct and a pair of mutually confronting doors which rotate about an axis transverse to the length of the duct, the doors being located relative to the duct, the openings and the flaps, so that, in a first position the doors obturate said at least two openings and provide a substantially unrestricted flow path through the nozzle, in a second position, downstream of the first position, the doors uncover the said openings and co-operate with the flaps when the flaps are in a convergent position, so that the flaps together with the doors provide deflecting surfaces that

redirect the flow of gases out through the said openings, and in a third position, upstream of the first position, the doors uncover the openings, define, at their upstream ends a reduced area throat for the gas flow path through the nozzle, and also define a divergent part of the gas flow path immediately downstream of the said throat thereby to reduce the pressure downstream of the throat to induce ambient air through the openings into the gas flow path through the nozzle, and means are provided for moving the flaps to accommodate the increased gas flow through the nozzle when the doors are in said third position.

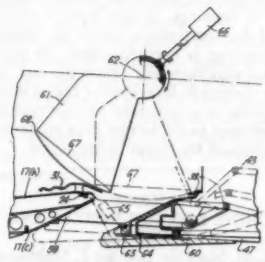


4,502,639

TURBOMACHINE EJECTOR NOZZLE

Gary F. Szuminski, Marietta, and Douglas J. Nightingale, Atlanta, both of Ga., assignors to Rolls-Royce Inc., New York, N.Y.

Filed Apr. 26, 1982, Ser. No. 372,016
Int. Cl.³ F02K 1/12, 1/38
U.S. Cl. 239—265.31 **10 Claims**



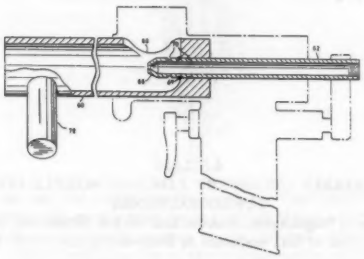
1. An exhaust nozzle for a gas turbine aero-engine comprising a duct, a plurality of movable flaps for varying the geometry of the nozzle, at least two forwardly and outwardly directed openings located upstream of the flaps, and a pair of mutually confronting doors each of which is mounted for rotation about an axis extending transverse to the length of the duct, wherein the doors are located relative to the duct and the openings so that, in a first position, they obturate the openings and mutually confronting surfaces of the doors define therebetween part of the gas flow path through the nozzle, the doors being movable to a second position, upstream of the first position, where they uncover the openings, define, at their upstream ends, a reduced area throat for the gas flow path through the nozzle, and also define a divergent part of the gas flow path immediately downstream of the said throat thereby to reduce the pressure downstream of the throat to induce ambient air through the openings into the gas flow path through the nozzle, and means are provided for moving the flaps to accommodate the increased gas flow through the nozzle when the said openings are uncovered.

4,502,640

MULTI-PURPOSE SPRAY GUN

Italo Nonis, 5163 Derry Road West, R.R. No. 2, Milton, Ontario, Canada L9T 2X6

Filed Sep. 8, 1982, Ser. No. 415,893
Int. Cl.³ B05B 7/30
U.S. Cl. 239—346 **6 Claims**



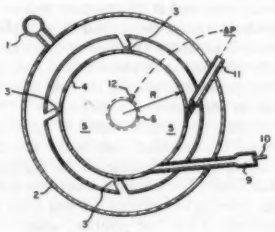
1. A hand held compressed air gun for spraying particulate materials comprising a hand held stock supporting a tubular housing, a barrel member having a breech end rotatably supported in the tubular housing, a handle attached to the barrel forwardly of the housing whereby the latter may be manually rotated relative to the tubular housing, means for mounting a hopper for particulate material on the tubular housing above an opening defined therein, the breech end of the barrel defining a further opening in the side wall of the barrel whereby on rotation of the barrel there is a continuously variable degree of coincidence between the opening in the breech end of the barrel and the opening in the breech block, and an air supply pipe extending axially through the breech block and the breech end of the barrel to a nozzle adjacent the opening therein and directed towards the nozzle end of the barrel, whereby to eject material falling into the barrel from the hopper.

4,502,641

FLUID ENERGY MILL WITH DIFFERENTIAL PRESSURE MEANS

Anthony J. Coombe, McEwen, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 29, 1981, Ser. No. 258,872
Int. Cl.³ B02C 19/12
U.S. Cl. 241—5 **5 Claims**



1. In a fluid energy mill of the confined vortex type for comminuting pulverulent solids having in combination a disc-shaped chamber defined by a pair of opposing circular-shaped axial walls and a peripheral wall, a multiplicity of inlets extending through the peripheral wall and aligned for directing gase-

ous fluid into the chamber tangentially to a circle whose radius is smaller than the radius, R, of the chamber, means for charging pulverulent solids to the chamber at the peripheral wall and discharge means for withdrawing pulverulent solids and gaseous fluid along the axis of the chamber, the improvement wherein the fluid energy mill is provided with means for measuring the differential pressure between the discharge and feed of the mill through openings in the chamber peripheral wall and in the discharge means each opening provided with a means for purging into the mill to prevent pluggage.

4,502,642

PROCESS FOR THE SEPARATION OF COATED NUCLEAR FUEL PARTICLES FROM A GRAPHITIC MATRIX AND INSTALLATION FOR IMPLEMENTING THE PROCESS

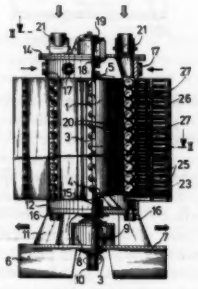
Hartmut Kronschnabel, Aachen; Wilhelm Goerings, Jülich; Johann Bölingen, Aachen, and Gerd Kleine-Vennekate, Haan/Gruiten, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich GmbH, Jülich, Fed. Rep. of Germany

Filed Jan. 28, 1982, Ser. No. 343,703

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1981, 3103900

Int. Cl.³ B02C *19/12*

U.S. Cl. 241—79.1 **14 Claims**



1. Installation for the treatment of graphitic fuel elements for high-temperature nuclear reactors, including fuel elements having nuclear fuel particles embedded in a graphitic matrix; comprising means for comminuting the fuel elements, and separating means for the comminuted fuel element material connected with the discharge of said comminuting means; brush means including a rotatably driven brush having bristles thereon and pressure means for said fuel elements movable towards the bristles of said brush, said pressure means including restraint means for securing the fuel elements against rotation, the bristles gradually removing the graphite encompassing the nuclear fuel particles and isolating the nuclear fuel particles with their coating or the nuclear fuel particles themselves.

4,502,643

HOUSEHOLD GRIST MILL

A. Hilmar Burggrabe, D-7031 Aidlingen, Kirschhalde 1, Fed. Rep. of Germany

Filed Jul. 29, 1982, Ser. No. 403,034

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1981, 3130519

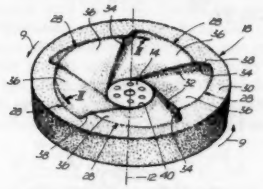
Int. Cl.³ B02C *7/12*

U.S. Cl. 241—257 R **9 Claims**

1. A household grain mill, comprising:

two circular millstones mounted on a common axis in opposing relation with each other, each of said millstones having a central opening, at least one of said openings being provided for feeding grain between said millstones, at least one of said millstones being mounted so as to rotate in a direction relative to the other of said millstones about said axis, and at least one of said millstones being mounted so as to be axially movable against a bias force of a spring;

each of said millstones having a ringlike grinding surface, said grinding surface of at least one of said millstones having an annular concave inner portion surrounded by an annular, planar outer portion, said annular inner portion connecting said central opening with said annular



outer portion, which together with a planar annular outer surface of the other of said millstones forms an outer grinding zone,

said annular, concave inner portion includes less than two recesses in each quadrant of said portion, said recesses each having a leading and a trailing flank in the rotational direction and being uniformly distributed about the common axis next to one another such that adjacent flanks of adjacent recesses form common edges, said trailing flanks of said recesses form the majority of said annular inner portion of said grinding surface.

4,502,644

PULL-OFF AID FOR DRAWING THREADS FROM BOBBINS

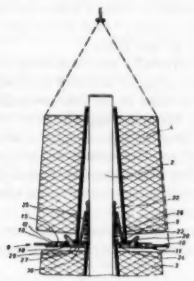
Dieter Schacht, Ev. Kirchstr. 35, 4152 Kempen 4, Fed. Rep. of Germany

Filed Jul. 24, 1981, Ser. No. 286,599

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1980, 3029598

Int. Cl.³ B65H *49/14*; D03J *5/10*

U.S. Cl. 242—129.8 **15 Claims**



1. A pull-off aid for threads drawn overhead from at least two supply bobbins which are disposed coaxially one above the other, which pull-off aid comprises; at least one disc, a bobbin carrier for supporting the two supply bobbins coaxially one above the other with said disc being slidably positioned between said bobbins, said disc having a plurality of non-flexible partially mutually overlapping segments each having arcuate outer ends which segments are radially displaceably mounted on said disc so as to form, together, a circular peripheral outer edge the diameter of which is adjustable, and control means responsive to variations in bobbin weight or bobbin

diameter for effecting radial displacement of said overlapping segments.

4,502,645

FISHING SPINNING REELS

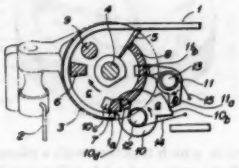
Kounin Sazaki, and Hideo Murakami, both of Fukuyama, Japan, assignors to Ryobi Limited, Hiroshima, Japan

Filed Jul. 26, 1982, Ser. No. 401,901

Claims priority, application Japan, Jul. 28, 1981, 56-112825[U]

Int. Cl.³ A01K *89/01*

U.S. Cl. 242—84.2 G **9 Claims**



3. A fishing spinning reel comprising:

a main body of a reel;

a rotor supported by said main body and provided with a pair of arms formed on a periphery of said rotor at diametrically opposing positions of said rotor, at least one of said arms having a bottom surface;

a bail arm lever and a pivot cam mounted on said pair of arms respectively;

first biasing means for biasing one of said bail arm lever and pivot cam toward a line-casting position;

said one of said bail arm lever and pivot cam being provided with an elongated cam having a boss at one end thereof;

a bail arm having both ends secured to said bail arm lever and pivot cam;

a first stopper mounted on the bottom surface of said one of said arms for holding said one of said bail arm lever and pivot cam in its line-casting position;

said one of said bail arm lever and pivot cam having a boss projected inwardly therefrom for engaging said first stopper mounted to hold said bail arm in its line-casting position against the biasing force of said first biasing means;

a kick lever arranged in one of said arms and being slidable in the lateral direction of said one of said arms in response to the rotation of said rotor;

a second stopper pivotally mounted on the bottom surface of said one of said arms for holding said one of said bail arm lever and pivot cam in its line-rewinding position, said second stopper being disengaged from holding said one of said bail arm lever and pivot cam when said bail arm is rotated over a predetermined angle against the biasing force of said first biasing means, thereby turning said bail arm to its line-casting position by the biasing force of said first biasing means;

second biasing means coupled to said second stopper for biasing said second stopper in the counter-clockwise direction;

engaging means provided on said second stopper for engaging said boss of said elongated cam to hold said one of said bail arm lever and pivot cam in its line-rewinding position, and for rotating said second stopper in the clockwise direction against the biasing force of said second biasing means when said bail arm is rotated in the counter-clockwise direction so as to cause disengagement of said engaging means from said boss of said elongated cam;

stop means formed on the periphery of said second stopper;

second engaging means pivotally mounted on the bottom surface of said one of said arms; and

means for biasing said second engagement means in the clockwise direction;

one end of said second engaging means engaging said stop means of said second stopper to hold said second stopper in such a position that said elongated cam is freely rotatable in the clockwise direction; and

said one of said bail arm lever and pivot cam having mans inwardly projected therefrom for rotating said second engaging means against the biasing force thereof, thereby releasing said one end of said second engaging means from said stop means of said second stopper so as to return said second stopper to its original position.

4,502,646

TWINE TENSIONER FOR LARGE ROUND BALE TWINE-WRAPPING MECHANISM

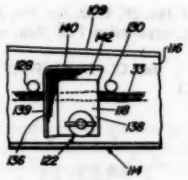
Gerald F. Meiers, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.

Division of Ser. No. 303,274, Sep. 17, 1981, Pat. No. 4,457,226.

This application Nov. 25, 1983, Ser. No. 555,318

Int. Cl.³ B65H *59/22*

U.S. Cl. 242—149 **2 Claims**



1. A twine tensioner comprising: a support having a planar surface; a generally rectangular plate having a rectangular planar portion bordered at first and second contiguous sides by first and second beveled portions, respectively, and including a straight edge located on a side opposite from and extending parallel to said first side; mounting means mounting said plate on said planar surface for straight-line movement toward and away from said planar surface; said means mounting including biasing means resiliently urging said plate toward said surface; said plate being disposed with said beveled portions inclined away from said surface; first and second guide pins fixed to said surface in adjacent spaced relationship to the first beveled portion and to the straight edge, respectively and in respective locations spaced to one side of said means mounting said plate on said surface to thereby establish a twine path beneath the plate and between the guide pins and the means mounting the plate on said surface; and said plate being arranged so that the first beveled portion and straight edge respectively constituted an entrance and an exit for twine being fed along said path.

4,502,647

TAPE ATTACHED SENSOR

James Zweighaft, and Steven P. Georgis, both of Boulder, assignors to Storage Technology Corporation, Louisville, Colo.

Filed Dec. 29, 1982, Ser. No. 454,227

Int. Cl.³ G11B *15/46*

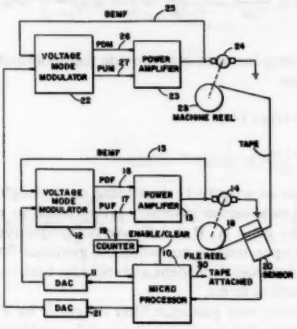
U.S. Cl. 242—191 **8 Claims**

7. In a system having automatic tape threading means for threading a tape from a first reel to a second reel, said first and second reels having first and second motors respectively coupled thereto, and each of said motors being responsive to acceleration or deceleration control pulses from a motor control circuit in order to controllably accelerate or decelerate the respective motor, a system for sensing when the tape from the first reel has become attached to the second reel during a tape threading operation comprising:

speed control means for controlling the rotational speed of said motors, and hence said first and second reels, during said tape threading operation, said speed control means being adapted to rotate said first and second reels at pre-

scribed velocities regardless of whether the tape from the first reel has attached to the second reel;

monitoring means for monitoring the frequency of occurrence of said acceleration control pulses delivered to a select one of said motors during the tape threading operation, said monitoring means including a counter for counting the number of said acceleration control pulses delivered to said select motor during said tape threading operation, which acceleration control pulses combine to rotate the reel coupled to said select motor at the prescribed



rotational velocity, the rotation of the second reel being supported at least in part by the rotation of the first reel once the tape has attached to the second reel, which attachment requires that the acceleration control pulses delivered to said select motor be delivered at a different rate in order to maintain the prescribed rotational velocity; and

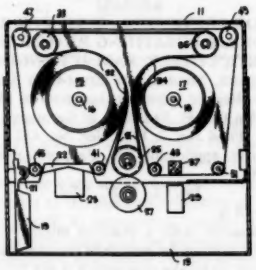
signaling means for signaling when the frequency of occurrence of said acceleration control pulses changes by a prescribed amount, which change in frequency signals that the tape has attached to the second reel.

4,502,648

ANSI-COMPATIBLE TAPE CARTRIDGE WITH OVERSIZE TAPE WIDTH

Chester W. Newell, San Jose, Calif., assignor to Newell Research Corporation, Saratoga, Calif.

Filed Jun. 17, 1983, Ser. No. 505,315
Int. Cl.³ G03B *1/04*; G11B *15/32*
U.S. Cl. 242—192 **4 Claims**



2. A tape cartridge comprising,

first and second spaced apart tape hubs mounted in a standard one-quarter inch tape cartridge housing, said spaced apart tape hubs having one-half inch tape mounted thereon,

a drive pulley in the central forward portion of the cartridge with first and sixth tape turn idlers spaced on either side of said drive pulley and a capstan position in close proximity thereto, with tape coming off the first tape hub on the said side of the cartridge as the first capstan idler and a magnetic head, said tape trained around the first capstan idler and past the head,

second and fifth tape turn idlers in opposed forward corners of the cartridge,

third and fourth tape turn idlers in opposed rear corners of the cartridge, with tape coming past the head and around the second, third fourth and fifth tape turn idlers, thence toward said sixth idler and toward the second tape hub, the combination of said tape hubs and the turn idlers defining a substantially symmetrical tape path, and

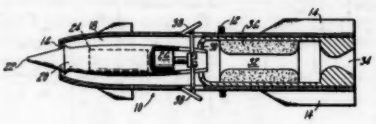
a drive belt trained around the drive pulley and a pair of driver belt idlers slightly forward of said third and fourth idlers in opposed rear corners of the cartridge, said drive belt contacting inward surfaces of said tape rolls.

4,502,649

GUN-LAUNCHED VARIABLE THRUST RAMJET PROJECTILE

Leo Botwin, Westport, and John A. Simpson, Southport, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 217,970, Dec. 19, 1980, Pat. No. 4,428,293.
This application May 16, 1983, Ser. No. 495,203
Int. Cl.³ F42B *15/10*
U.S. Cl. 244—3.1 **2 Claims**



1. A method for causing a gun-launched ramjet projectile to substantially follow a predetermined psuedo vacuum ballistic trajectory, comprising the steps of:

providing a gun-launched ramjet projectile having a maximum thrust characteristic and also having a drag characteristic which is less than said maximum thrust characteristic;

providing a means in said ramjet projectile for varying the thrust of said ramjet projectile in flight;

accelerating said ramjet projectile in a gun to an initial velocity at which said ramjet is operative to provide a maximum thrust within the atmosphere;

reducing the thrust of said projectile until its in-flight velocity substantially matches the drag characteristic; and

varying the thrust of said ramjet projectile so that the thrust characteristic follows the drag characteristic causing said ramjet projectile to follow a pseudo vacuum trajectory.

4,502,650

AUGMENTED PROPORTIONAL NAVIGATION IN THIRD ORDER PREDICTIVE SCHEME

William R. Yueh, Claremont, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Sep. 22, 1982, Ser. No. 421,540
Int. Cl.³ F41G *7/22*
U.S. Cl. 244—3.15 **15 Claims**

1. A method for terminal guidance of a missile to intercept a target, the missile having missile control surfaces to control missile flight direction, said method being a third order scheme employing a predictive proportional navigation system including an autopilot, an antenna, a navigation ratio n', an inertial reference unit (IRU) and a noise adaptive guidance computer, said system including noise and radome error compensation,

said computer having an adaptive guidance filtering system, said proportional navigation system having input values for the range R and the closing velocity V_c between missile and target, line of sight (LOS) angle σ, antenna electrical boresight error angle ϵ, angle θ between the antenna axis and the missile axis, the rate of change $\dot{\theta}$ of the angle θ, and time varying noise-adaptive time constants τ_d and τ_c, where $\epsilon=\sigma_M-\theta$, said system deriving a modified value of LOS angle σ_M, an estimate of LOS angle $\hat{\sigma}$ and a residual LOS angle $\sigma_M-\hat{\sigma}$, the output of said filtering system being a smoothed line of sight rate $\dot{\hat{\sigma}}$, actual missile lateral acceleration being detected by said IRU, the output of said IRU being a measure of actual lateral acceleration $\hat{Y}_M$, said method comprising the steps of:

applying the boresight error angle ϵ to a first combining point;

multiplying the residual LOS angle output from said first combining point by a gain A to provide the value $A(\sigma_M-\hat{\sigma})$;

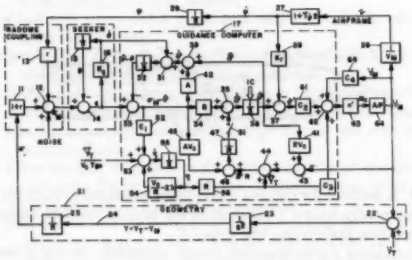
combining the value $A(\sigma_M-\hat{\sigma})$ with the LOS rate $\dot{\hat{\sigma}}$ at a second combining point to provide an estimated LOS rate $\dot{\hat{\sigma}}$;

combining said estimated LOS rate $\dot{\hat{\sigma}}$ with said rate $\dot{\theta}$ to provide the value $\dot{\hat{\sigma}}-\dot{\theta}$;

integrating the value $\dot{\hat{\sigma}}-\dot{\theta}$ to provide $\hat{\sigma}-\theta$;

feeding back the value $\hat{\sigma}-\theta$ to said first combining point;

combining said value $\hat{\sigma}-\theta$ with the angle ϵ to provide the value $\sigma_M-\hat{\sigma}$ at the input to said filtering system;



multiplying the residual LOS angle by a gain B to provide the value $B(\sigma_M-\hat{\sigma})$;

multiplying the LOS rate $\dot{\hat{\sigma}}$ by $2V_c$;

combining said multiplied LOS rate with acceleration term $\hat{Y}_M$ at a third combining point to provide the term $2V_c\dot{\hat{\sigma}}-\hat{Y}_M$;

feeding back said term $2V_c\dot{\hat{\sigma}}-\hat{Y}_M$ to a fourth combining point;

multiplying the residual LOS angle by AV_c to provide the value $AV_c(\sigma_M-\hat{\sigma})$;

feeding forward said value $AV_c(\sigma_M-\hat{\sigma})$ to a fifth combining point;

multiplying the residual LOS angle by a gain C_1 to provide the term $C_1(\sigma_M-\hat{\sigma})$;

combining the term $C_1(\sigma_M-\hat{\sigma})$ with target acceleration and range input values to provide an estimated target acceleration value $\hat{Y}_T(\ddot{\hat{Y}}_T)$;

feeding forward said value $\hat{Y}_T(\ddot{\hat{Y}}_T)$ to said fourth combining point;

combining $\hat{Y}_T(\ddot{\hat{Y}}_T)$ with the value $2V_c\dot{\hat{\sigma}}-\hat{Y}_M$ at said fourth combining point to provide an estimated LOS acceleration term $\ddot{\hat{\sigma}}R$;

combining the values $AV_c(\sigma_M-\hat{\sigma})$ and $\ddot{\hat{\sigma}}R$ at said fifth combining point to provide the value $2V_c\dot{\hat{\sigma}}-\hat{Y}_M+\hat{Y}_T+AV_c(\sigma_M-\hat{\sigma})$;

dividing the immediately preceding value by the range R to provide the value

$$\eta+\frac{2\dot{\hat{\sigma}}}{T_{go}}-\frac{\hat{Y}_M}{V_cT_{go}}+\frac{A}{T_{go}}(\sigma_M-\hat{\sigma});$$

combining the immediately preceding value with the value $B(\sigma_M-\hat{\sigma})$ at a sixth combining point to provide the corrective and predictive term

$$\dot{\hat{\sigma}}=\eta+\frac{2\dot{\hat{\sigma}}}{T_{go}}-\frac{\hat{Y}_M}{V_cT_{go}}+\left(B+\frac{A}{T_{go}}\right)(\sigma_M-\hat{\sigma});$$ then

integrating the term $\dot{\hat{\sigma}}$ to provide the smoothed LOS rate $\hat{\sigma}$; where

$$A=1/\tau_d+1/\tau_c$$

$$B=1/\tau_d\tau_c$$

and C_1 varies adaptively depending on boresight error noise level and in a manner inversely proportional to τ_d;

whereby gains A, B and C_1 are noise-adaptive and dependent upon time-to-go, while the guidance filter output $\hat{\sigma}$ is also range dependent and includes both corrective and predictive terms;

multiplying said guidance filter output $\hat{\sigma}$ by a gain C_2 and applying that product to a seventh combining point;

multiplying the estimated target lateral acceleration term $\hat{Y}_T$ by a gain C_3 which is a function of target bandwidth λ_t and T_{go}, the value $C_3\hat{Y}_T$ being fed forward to said seventh combining point;

multiplying said seventh combining point output $C_3\hat{Y}_T+C_2\dot{\hat{\sigma}}$ by the navigation ratio n' which is a function of control effort weighting factor γ and T_{go}; and

applying the immediately preceding term to said autopilot as command acceleration to modify the position of the missile control surfaces and to account for target lateral acceleration, employing optimal guidance Law C, thereby providing nearly optimal miss distance and low sensitivity to radome error.

4,502,651

DEVICE FOR PREVENTING BUZZ IN SUPERSONIC INTAKES OF AIR-BREATHING REACTION ENGINES, PARTICULARLY, RAM JET ENGINES

Günther Jungclaus, Munich, and Ernst-Otto Krohn, Lohmar, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Fed. Rep. of Germany

Filed Jan. 2, 1979, Ser. No. 432

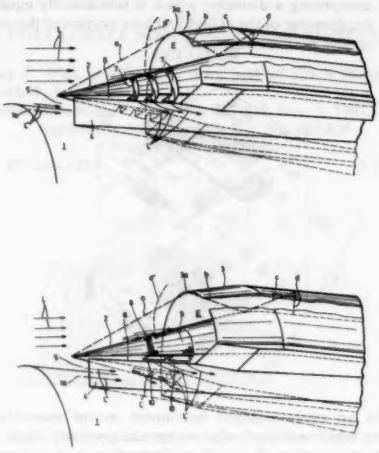
Claims priority, application Fed. Rep. of Germany, Jan. 12, 1978, 28011190

Int. Cl.³ F02C 7/04

U.S. Cl. 244—53 B **4 Claims**

1. In combination with a reaction engine mounted on a missile body for driving the missile of the type having a supersonic intake with air intake pipe which is not fully rotationally symmetrical and having particularly a semi-rotationally symmetrical air intake cross-section, a device comprising the intake pipe having a front inlet with an intake opening plane at the front of the intake pipe, a displacement body mounted on the missile body partly within said air intake in a spaced relationship with the intake pipe and the missile body and extending through said inlet plane, said dispacement body including air

passage means with at least one air outlet port provided ahead of the intake pipe in respect to the direction of flow for passing



air from above said displacement body to an air gap between said displacement body and said missile body.

4,502,652

PROCESS AND APPARATUS FOR SUPPRESSING EXTERNAL LOAD CARRYING WING FLUTTER FOR AIRCRAFT

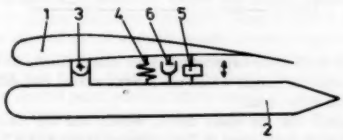
Elmar Breitbach, Göttingen, Fed. Rep. of Germany, assignor to Deutsche Forschungs- und Versuchsanstalt fur Luft-und Raumfahrt e.V., Cologne, Fed. Rep. of Germany

Filed Sep. 9, 1982, Ser. No. 416,174

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1981, 3136320

Int. Cl.³ B64D *1/00*

U.S. Cl. 244—75 A **8 Claims**



1. Apparatus for suppressing external load-carrying wing flutter of aircraft with a carrying wing (1) and at least one external load (2), comprising means connecting the external load to the carrying wing about an axis (3) arranged at a right angle with respect to the plane of symmetry of the aircraft, a system of springs (7, 8) arranged in parallel and connected between the carrying wing and the external load, said system of springs including a first spring (7) connected between the external load and the carrying wing, said first spring (7) constructed to be linear and relatively stiff to permit only small spring excursions, and a second spring (8) constructed to be non-linear with negative stiffness and passing through zero in the region of the negative stiffness, and means (11) for displacing the working point (21) defined by the passing through zero of said second spring in response to the deflection of the first spring.

4,502,653

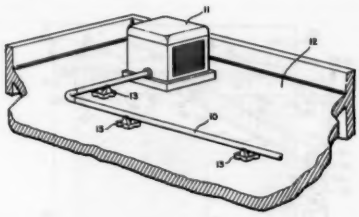
PIPE SUPPORTING DEVICE

Marvin R. Curtis, Jr., North Salt Lake, Utah, assignor to Miro Industries, Inc., Midvale, Utah

Filed Dec. 22, 1982, Ser. No. 452,037

Int. Cl.³ F16L *3/16*

U.S. Cl. 248—55 **10 Claims**



1. A pipe-supporting device adapted to receive and support an exposed pipe on a roof, said device comprising a base having a substantially flat bottom for resting on the roof; upwardly tapered structure secured on and rising from said base to provide a pipe positioning and supporting structure having a pocket for positioning a pipe therein; trough means within the pocket for receiving roller means therein; roller means adapted to fit into the trough means and to rotate therein and adapted to have a pipe rest thereon to be supported above the base, said pipe positioning and supporting structure having lower ends forming a symmetrical periphery at the base which substantially evenly distributes the pipe load on the roller means over the base and on the roof.

4,502,654

TRIPOD STAND

Percy F. Albee, Jr., Bristol, R.I., assignor to Q-Panel Corporation, Providence, R.I.

Filed Mar. 18, 1983, Ser. No. 476,836

Int. Cl.³ F16M *11/38*

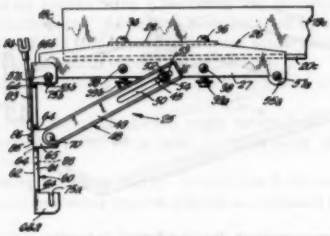
U.S. Cl. 248—168 **5 Claims**

1. A collapsible tripod stand for an easel comprising a pair of outer legs and a center leg of channel cross section, one end of each leg having at least an outwardly extending wing portion, said legs normally lying in alternate facing relationship whereby the wing portions of the outer legs overly the wing portions of the center leg, an opening in each wing portion that faces an adjacent wing portion of another leg, a fastener secured in the openings of the center leg and passing loosely through an opening of each outer leg whereby the outer legs may be moved relative to the center leg to a generally pyramidal form.

4,502,655
TELEPHONE MOUNTING BRACKET FOR MOBILE HOME

Frank T. White, Rockaway, N.J., assignor to AT&T Technologies, Inc., New York, N.Y.

Filed Oct. 14, 1983, Ser. No. 542,301
Int. Cl.[3] A47B 96/06
U.S. Cl. 248—228 8 Claims



1. An object mounting bracket comprising: a longitudinally extending base for said bracket, attaching means for fixedly securing said base to support means for said bracket, strut means coupled at one of its ends to a longitudinally central part of said base by a first pivot connection about which said strut means is angularly movable in a longitudinal-transverse plane, a longitudinally extending angularly tiltable mounting plate for an object to be supported by said bracket, said plate providing a mounting surface normal to said plane and having a longitudinally central part of said plate coupled to the other end of said strut means by a second pivot connection at which such central part of said plate is maintained by said strut means in transversely spaced relation from said base, and first and second base-to-plate fastening means providing selectably detachable, third and fourth, pivot connections between, respectively, (a) portions respective to said base and plate which are leftwardly spaced longitudinally from, respectively, said first and second pivot connections, and (b) portions respective to said base and plate which are rightwardly spaced longitudinally from, respectively, said first and second connections, said first and second fastening means enabling said plate to be selectably fastened left- and right-handedly to said base with said base, plate and strut means forming in each case a structurally stable triangular configuration.

4,502,656
NON-BINDING, QUICK DISCONNECT INSTRUMENT MOUNT ASSEMBLY

Richard J. Zeitler, Brookfield Center, Conn., assignor to The Zei-Mark Corporation, Brookfield Center, Conn.

Filed Feb. 4, 1983, Ser. No. 464,123
Int. Cl.[3] A47B 91/00
U.S. Cl. 248—346 7 Claims

1. A non-binding, quick disconnect instrument mount assembly comprising

A. a base plate securely mountable to a desired support member and incorporating at least two beveled, countersunk pin receiving holes formed in one surface thereof, each of said pin receiving holes comprising

1. a tapered, countersunk portion defining the hole entry zone, and

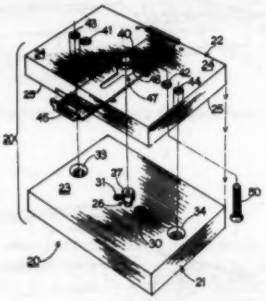
2. a substantially cylindrical bore portion joining with and extending from the bottom of the countersunk portion; and

B. a mounting plate adapted for secure mounted engagement with any desired instrument and incorporating at least two dowel pins, each

1. being securely mounted to the mounting plate and positioned for cooperative engagement with a pin receiving hole,

2. extending from the mounting plate a perpendicular distance which is substantially identical to the perpendicular depth of the countersunk portion of the cooperating pin receiving hole, and

3. comprising a diameter which is substantially equal to the diameter of the cylindrical bore portion of the cooperating pin receiving hole,

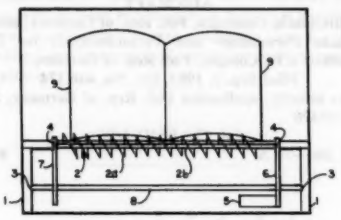


whereby an easily engaged instrument mount assembly is achieved which automatically centers and precisely aligns the instrument mounting plate with the base plate, each and every time, while preventing binding engagement therebetween.

4,502,657
HOLDER OF SHEET MUSIC

Archie Monfort, 7500 Moon Rd., Columbus, Ga. 31904

Filed Jul. 7, 1981, Ser. No. 259,947
Int. Cl.[3] A47B 97/04
U.S. Cl. 248—451 7 Claims



1. In a holder for supporting sheet music, books or the like having opposed pages which are movable from one side to the other and vice versa:

a support for the sheet music, books and the like which supports said pages in flat, opposed relationship for turning from one side to the other and vice versa,

a plurality of individual page retaining members arranged on said support transversely in front of and across said pages for temporarily retaining said pages by preventing said pages from turning,

movable support means for said individual page retaining members supporting said members for movement toward and away from the sheet whereby movement of the sheet against said members, such as manual turning of said papers, causes said members to move away from said page temporarily to release any pressure on said page so that said pages can move,

means on said support means biasing said support means and said individual members toward said pages for return of said members to position against said pages after movement therefrom,

said individual members being like the individual bristles of

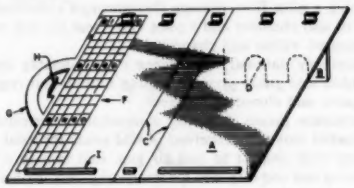
a cylindrical brush and the support means comprising the longitudinal center of the brush.

4,502,658

COLLAPSIBLE BINGO SHEET AND MARKER RETAINER

Buddy C. Wirt, and Doris J. Wirt, both of 256 S. Blake Rd., Norfolk, Va. 23505

Continuation-in-part of Ser. No. 327,123, Dec. 3, 1981,. This application Apr. 11, 1983, Ser. No. 483,829
Int. Cl.³ A63F 9/00
U.S. Cl. 248—452 3 Claims



1. Foldable support means including three relatively flat panels comprising a central panel and two side panels, all three panels being approximately the same in vertical height, the two side panels being more than twice the width of the central panel, said two side panels each being hingedly related to said central panel along vertically-oriented hinge lines on opposite vertical edges of said central panel, clip means integrally-formed from all three of said panels adjacent their respective uppermost ends and with projecting end portions thereof projecting away from the planar surfaces of each one of said panels, said two side panels each containing approximately twice as many integrally-formed clip means as said central panel, said clip means all facing inwardly when the support is in a folded condition, leg means located on and projecting from the surface of each side panel that is opposite from the surface from which the clip means end portions project when the support is in said folded condition, said leg means being located slightly below the area of said clip means on said side panels, interrupted co-linear stop means adjacent the lowermost edges of each of the three panels, said stop means facing and projecting inwardly, similar to the clip means, when the support means is in its folded condition, handle and latch means extending in a co-planar direction outwardly from a central area of the outer edge of one of said side panels, cooperating co-planar latch means formed along a central area of the outer edge of said other side panel, both said latch means extending away from said central panel when all three panels are in a relatively co-planar position with respect to each other, said latch means on the two side panels when pressed together in cooperating relationship maintaining said support means in the folded condition for carrying or storage.

4,502,659

COLLET-CONTAINING MOLD FOR UNDERCUT MOLDING

Ronald L. Stephenson, Lapel, and Arthur G. Beer, Pendleton, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 21, 1983, Ser. No. 563,794
Int. Cl.³ B29C 1/14; B29F 1/00
U.S. Cl. 249—66 R 2 Claims

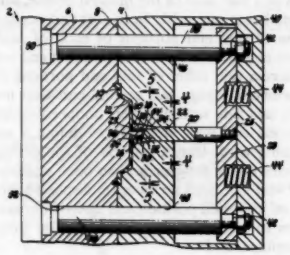
1. An injection molding mold comprising:

first and second relatively moveable parts coacting in a mold-closed position to define a molding cavity for shaping a molded article;

a socket in said first part adjacent said cavity for receiving and constrictively engaging a molding head while said mold is in said mold-closed position;

an elongated, collet-like mold member axially reciprocally moveable in said socket between a retracted article-forming position and an extended article-release position;

a self-opening molding head integral with and forming one end of said member, said head comprising a plurality of elastic, finger-like segments, said elastic segments (1)



being flexed into a stressed condition and gathered together in contiguity one to the other by said socket to define a portion of said cavity when said member is moved into said retracted position and (2) springing outwardly under substantially their own power to a substantially unstressed condition to release said article when said member is moved into said extended position; and

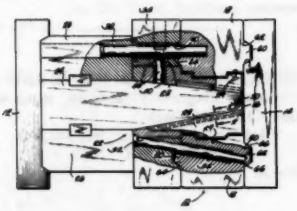
means for moving said member between its retracted and extended positions.

4,502,660

MOLD INCLUDING SIDE WALLS WITH LOCKING PROJECTIONS

LeRoy D. Luther, 4645 N. 147th St., Brookfield, Wis. 53005, and Robert E. Brock, S69 W32751 Westgate Dr., Mukwonago, Wis. 53149

Filed Nov. 21, 1983, Ser. No. 553,501
Int. Cl.³ B29C 1/06, 1/16; B29F 1/00
U.S. Cl. 249—144 6 Claims



1. A mold defining a mold cavity for manufacture of an article having a plurality of side walls, the mold comprising

a first end wall member including a surface, a first portion of said surface defining a mold surface and a plurality of cavities formed in said surface, said cavities being spaced outwardly from said mold surface, each of said first end wall member cavities including an inner cam surface adjacent said mold surface and an outer cam surface spaced outwardly from said inner cam surface,

a second end wall member including a surface facing said first end wall, said second end wall member surface including a plurality of spaced apart cavities, each of said cavities of said second end wall member including an inner cam surface and an outer cam surface,

at least one of said first and second end wall members being

adapted to be supported for movement toward and away from the other of said first and second end wall members between a molding position and an open position,

a plurality of mold side wall members, each of said side wall members including opposite end portions, one of said end portions facing said first end wall member and the other of said end portions facing said second end wall member, and said side wall members each including an inwardly facing surface comprising a mold surface for forming at least a portion of a side wall of the molded article, said side wall members being moveable from a closed position wherein said one of said end portions of each of said side wall members engage said surface of said first end wall member and wherein said other of said end portions of said side wall members engage said second end wall member and wherein said side wall members cooperate with said first and second end wall members to define a mold cavity conforming to at least a portion of the desired exterior dimensions of the articles, and an open position in which each of said side wall members is displaced laterally outwardly of its closed position and away from said end wall members to a location in spaced relation from said end wall members, and

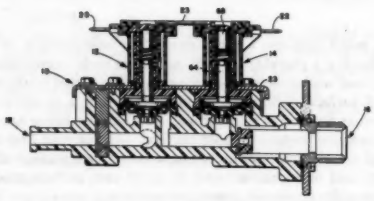
means for preventing inward and outward movement of said mold side wall members with respect to said mold cavity when said mold side wall members are in said closed position, said means for preventing inward and outward movement including projections extending from said one of said end portions of each of said side wall members, said projections being housed in said first end wall member cavities when said first end wall member and said side wall members are in said closed position and to prevent outward movement of said side wall members, said projections including outer cam surfaces engaging said outer cam surfaces of said first end wall member cavities and inner cam surfaces engaging said inner cam surface of said first end wall member cavities, and said other of said end portions of said side wall members each including projections adapted to be housed in said second end wall member cavities when said second end wall member and said side wall members are in said closed position and to prevent outward movement of said side wall members, said projections of said other of said end portions including outer cam surfaces engaging said outer cam surfaces of said second end wall member cavities and inner cam surfaces engaging said inner cam surfaces of said first end wall member cavities.

4,502,661

ELECTRICALLY ACTUATED VALVE ASSEMBLY

Wesley S. Swanson, Elkgrove Village, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 4, 1983, Ser. No. 548,800
Int. Cl.³ F16K *31/40*
U.S. Cl. 251—30 **6 Claims**



1. An electrically energized pilot operated fluid flow valve assembly comprising:

(a) a coil of electrically conductive material;

(b) a pair of tubular pole pieces formed of ferromagnetic material received centrally within said coil, said pole pieces disposed in axially spaced arrangement to define therebetween an air gap;

(c) armature guide means, formed of non-metallic material received within said tubular pole pieces and defining therein a fluid pressure sealing hollow with one end closed and disposed adjacent an end of said tubular pole pieces remote from said air gap, with the opposite end of said armature guide means defining an open end with the periphery thereof enlarged from the diameter of said tubular pole pieces;

(d) diaphragm means sealed about the said enlarged periphery of said armature guide means to form in cooperation therewith a fluid sealing chamber within said armature guide means, said diaphragm means including means defining a pilot flow passage therethrough communicating with said chamber and a pilot valve seat for said passage disposed within said chamber;

(e) auxiliary stationary pole piece means slidably disposed within said guide pressure sealing hollow and registered against said closed end thereof;

(f) armature means including a member of ferromagnetic material moveably received in said guide for axial movement with respect to said air gap, said armature means having one end disposed for contacting said auxiliary pole piece and the opposite end including means defining a pilot valve for sealing against said pilot valve seat;

(g) spring means having one reacting surface thereof contacting said auxiliary pole piece and the opposite reacting surface thereof contacting said armature means for biasing said auxiliary pole piece and said armature means in opposite directions, wherein said pole piece is urged against said closed end of said guide and said pilot valve is urged against said pilot valve seat;

(h) means defining a main valving surface on said diaphragm portions thereof external to said chamber;

(i) housing means defining a valve inlet passage and having said coil and guide received thereon, said housing means defining a main valve seat disposed for sealing contact with said main valving surface and communicating with a valve outlet passage; and

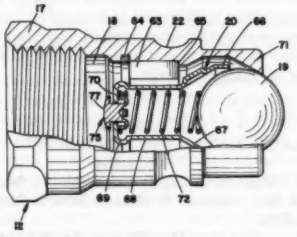
(j) means defining a bleed passage connecting said inlet passage and said chamber continuously for limited fluid communication therebetween.

4,502,662

SHROUDED FLUID COUPLING

Ojars Maldavs, and William J. Leddy, Jr., both of Lincoln, Nebr., assignors to Imperial Clevite Inc., Glenview, Ill.

Filed Feb. 14, 1983, Ser. No. 466,140
Int. Cl.³ F16L *37/28*
U.S. Cl. 251—149.6 **8 Claims**



1. In a fluid coupling having a housing, a valve seat, a movable valve closure member within the housing engageable with the valve seat, and a generally tubular shroud within the housing for protecting the valve closure member from surges of fluid in operation having a first open end in which the valve closure member is positioned and a second end, the improvement comprising valve means in said second end of the shroud

for permitting fluid to flow through the shroud in one direction and for preventing fluid from flowing through the shroud in the other direction.

4,502,663

COCK HAVING A SPHERICAL PLUG

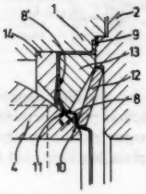
Richard Huber, Fürstenstrasse 17 B, A-2340 Mödling, Fed. Rep. of Germany

Filed Jun. 10, 1982, Ser. No. 387,675

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1981, 3123549

Int. Cl.³ F16K *25/00*

U.S. Cl. 251—174 **7 Claims**



1. In a shut-off cock of the type including:

a housing;

a spherical valve plug positioned for floating movement within the housing;

means for rotating the valve plug between a closed position and a throughflow position of an opening in a said valve plug; and,

annular seal members supported by said housing and sealingly engaging the periphery of said valve plug;

the improvement comprising at least one said seal member being comprised of:

a resilient thin-walled sheet metal annulus having opposite faces and which is rigidly supported by said housing at one of the inner and outer peripheries of said annulus;

a first ring shaped section of said annulus extending towards and continuously resiliently sealingly engaging the outer periphery of said valve plug;

a second ring shaped section of said annulus coaxial with said first ring shaped section and spaced from said valve plug when said valve plug is in its throughflow position;

and a rigid annular back-up ring rigidly supported by said housing, said rigid annular back-up ring abutting that face of said second ring shaped section that is remote from said plug valve and having a surface configuration complementary to the juxtaposed surface of said ring shaped section, said rigid annular back-up ring providing a rigid support for said second ring shaped section and inhibiting movement of said second ring shaped section when said second ring shaped section is engaged by said plug valve when in its closed position and under pressure loading.

4,502,664

MACPHERSON SPRING COMPRESSOR

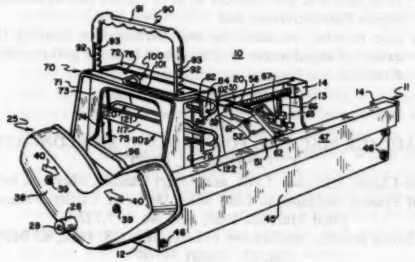
Roy B. Bendickson, Racine, and Raymond R. Zuzinec, Sr., Kenosha, both of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.

Filed Mar. 3, 1983, Ser. No. 471,896

Int. Cl.³ B60P *1/48*

U.S. Cl. 254—10.5 **16 Claims**

10. A MacPherson strut spring compressor for compressing the spring of a MacPherson strut assembly comprising a frame having front and rear plates connected by a pair of longitudinally extending compression screw members, a drive mechanism mounted on said front plate operatively connected to said pair of compression screw members, a strut clamp assembly mounted on said compression screw members for movement therealong in response to operation of said drive mechanism, a carriage freely mounted on said compression screw members positioned in use near said front plate, upper and lower positioning assemblies mounted on said carriage for vertical movement with respect thereto to accommodate MacPherson strut assemblies of different sizes and spring offsets, said upper positioning assembly being vertically adjustable independently of said lower positioning assembly, said lower positioning assembly being vertically adjustable with respect to said frame, spring biased locking mechanism cooperating with said upper positioning assembly for locking same at a plurality of discrete vertically spaced apart locations, spring biased locking mecha-



nism cooperating with said lower positioning assembly for locking same at a plurality of discrete vertically spaced apart locations, whereby said upper and lower positioning assemblies and said carriage cooperate to support and retain MacPherson strut assemblies of different sizes and spring offsets while maintaining the longitudinal axis of the MacPherson strut assembly substantially horizontal such that operation of said drive mechanism causes said strut clamp assembly to move on said compression screw members toward said carriage thereby compressing the spring of the MacPherson strut assembly to permit disassembly of same.

4,502,665

APPARATUS FOR MOVING A CYLINDRICAL OBJECT

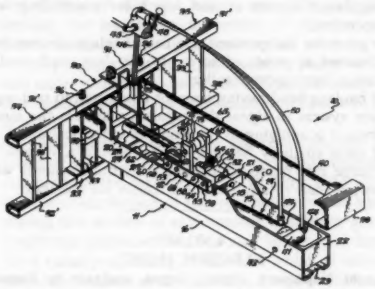
Lloyd S. Yoder, 9682 Keller Rd., Clarence Center, N.Y. 14032

Continuation of Ser. No. 380,137, May 20, 1982, abandoned.

This application Aug. 27, 1984, Ser. No. 644,662

Int. Cl.³ E21B *19/00*

U.S. Cl. 254—29 R **13 Claims**



13. In apparatus for moving an elongated cylindrical object along its longitudinal axis, said apparatus having a frame, a carriage mounted on said frame for reciprocating movement therealong, and an actuator mounted on said frame, the improvement which comprises:

a first jaw member mounted on said carriage for movement therewith;

an intermediately-pivoted lever mounted directly on said

carriage, said lever having one marginal end portion adjacent one distal end thereof engaged by said actuator and having its other marginal end portion adjacent its other distal end portion arranged in spaced relation to said first jaw member, the engagement between said actuator and said lever one marginal end portion providing the sole means for moving said carriage relative to said frame, said lever being movable in one angular direction to cause said lever other marginal end portion to move toward said first jaw member to grippingly capture said object therebetween, and movable in the opposite angular direction to cause said lever other marginal end portion to move away from said first jaw member so as to release said cylindrical object therebetween; and

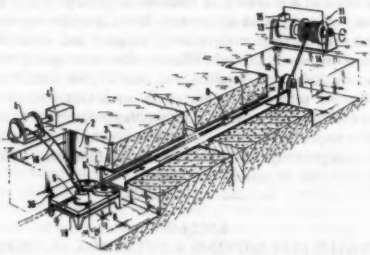
a stop member mounted on said carriage for limiting the extent of angular movement of said lever in said opposite direction.

4,502,666

HAULAGE MACHINE FOR HAULING AN ELONGATE CYLINDRICAL UNIT

Jean-Claude Mattelon, Lyon, and Albert Chauzu, Meyzieu, both of France, assignors to Les Cables De Lyon, Clichy, France

Filed Mar. 22, 1983, Ser. No. 477,713
Claims priority, application France, Mar. 23, 1982, 82 04882
Int. Cl.³ B65H *59/00*
U.S. Cl. 254—134.3 FT **3 Claims**



1. In combination, a haulage machine for hauling an elongate cylindrical unit inside a duct, said machine including:

a winch on which a haulage rope is wound, said haulage rope being hitched to the elongate cylindrical unit by a haulage head,

a regulation system at said winch for controlling winch operation,

one or more independent auxiliary haulage devices being disposed at points of access to the duct, each auxiliary device having drive rollers,

said haulage head having a sensor connected to said regulation system to signal the regulation system the haulage force it is applying to the elongate cylindrical unit,

and each auxiliary haulage device having a variable discharge rate pump controlling a hydraulic motor whose output shaft rotates the drive rollers via clutches.

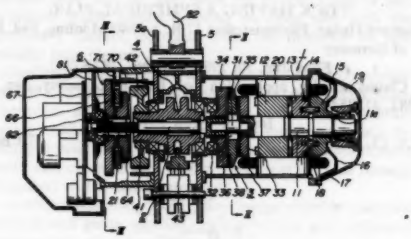
4,502,667

ELECTRIC HOIST

Takayoshi Nakamura, Atsugi, Japan, assignor to Kabushiki Kaisha Kito, Yamanashi, Japan

Filed Aug. 19, 1983, Ser. No. 524,713
Claims priority, application Japan, Aug. 25, 1982, 57-146210
Int. Cl.³ B66D *1/14*; F16D *47/00*
U.S. Cl. 254—350 **4 Claims**

1. An electric hoist including an electric motor, a driving shaft connected to a rotor shaft of said electric motor, a reduction gear train for transmitting rotation of said driving shaft to a load sheave, and a mechanical brake assembly in said reduction gear train, comprising an overload safety device arranged between said driving shaft and said rotor shaft of said motor, said overload safety device comprising a support member fixed to said rotor shaft, a retainer member fitted onto said driving shaft, and a disc having a one-way clutch and arranged be-



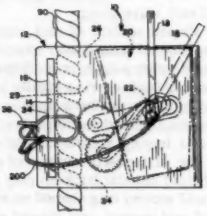
tween said support and retainer members through friction plates, one of said friction plates between said retainer plate and said disc having larger friction transmission force than that of the other friction plate between said support member and said disc.

4,502,668

REMOVABLE DOUBLE-ACTION ROPE GRIP

Cleveland E. Dodge, Jr., R.D. 1-7, Pownal, Vt. 05261

Filed Jun. 6, 1983, Ser. No. 501,623
Int. Cl.³ A47L *3/04*; A62B *1/16*; B65H *59/16*
U.S. Cl. 254—391 **19 Claims**



1. A rope grip comprising:

(a) guide means defining a first gripping surface;

(b) operator means defining a second gripping surface having upper and lower extremities, said first and second gripping surfaces defining a channel for receiving a rope;

(c) first support means for pivotally supporting said operator means with said second gripping surface in facing spaced relationship to said first gripping surface, said lower extremity being positioned at a point further from said first gripping surface than said upper extremity;

(d) restricting structure;

(e) second support means for pivotally engaging said restricting structure between said first and second gripping surfaces at a variable distance from the pivot point; and

(f) securing means for securing the rope grip to an operator mechanically coupled to said restricting structure, said securing means being positioned and configured to urge said restricting structure toward said upper extremity in response to downward motion of said securing means.

4,502,669

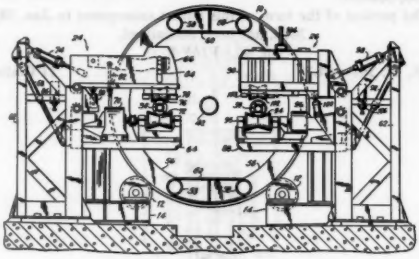
INSIDE-OUTSIDE TUBE QUENCHING APPARATUS

Christian H. Heine, Jr., Longview; Robert W. McGaw, Irving; W. Edwin Wetzel, Jr., Daingerfield, all of Tex., and Joseph Ziegler, Apollo, Pa., assignors to Lone Star Steel Company, Dallas, Tex.

Division of Ser. No. 352,945, Feb. 26, 1982, Pat. No. 4,417,928. This application Aug. 12, 1983, Ser. No. 522,530

Int. Cl.³ C21D *1/62*

U.S. Cl. 266—114 **7 Claims**



1. Apparatus for simultaneously quenching the inside and outside surfaces of a tubular having leading and trailing ends comprising substantially cylindrical frame means oscillatible about its axis through an angle of 180° from a first position to a second position, driving means connected with said frame means and adapted to oscillate said frame means between said first and second positions, at least one mandrel means eccentrically located within said frame means and having mounted on one end thereof inside quench head means, at least one outside quench head means mounted on said frame means coaxially with said inside quench head means; first clamping means mounted on said frame means adapted to releaseably clamp said mandrel means to said frame means, quenching water supply means communicating with said mandrel means and said outside quench head means, retractable guide roll means located adjacent said outside quench head means adapted to quide and convey said tubular past said inside quench head means and said outside quench head means, first retractable conveying means located to engage and convey said tubular over said mandrel means when said frame means is in its first position, second clamping means mounted on said frame means adapted to releaseably clamp said tubular to said frame means, stop means adapted to contact the leading end of said tubular when the trailing end of said tubular has passed over said inside quench head means and second retractable conveying means located along said mandrel means and adapted to engage and convey said tubular over said mandrel means when said frame means is in its second position.

4,502,670

GAS HOOK-UP TO A LADLE

Gunther R. Goebel, Grampian, and Richard G. Hall, Kylertown, both of Pa., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Feb. 2, 1984, Ser. No. 576,290

Int. Cl.³ C21C *5/48*

U.S. Cl. 266—220 **10 Claims**

10. An apparatus for selectively connecting a gas supply to a vessel employed to process molten metal, comprising:

(a) a vessel having the bottom and sides constructing to contain said molten metal;

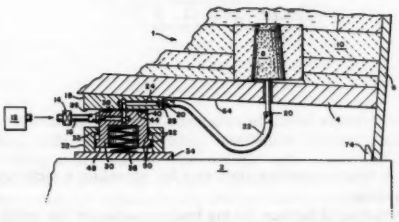
(b) at least one porous plug means located in a selected portion of said vessel for directing said gas into a selected interior portion of said vessel;

(c) sealer plate means connected to an external surface of said vessel bottom at a location remote from said porous plug means, said plate means having a gas passage therethrough which provides fluid communication from an inlet opening located in a face portion of said sealer plate to an outlet opening located in an outlet portion of said sealer plate;

(d) a gas conduit for directing said gas from said sealer plate to said porous plug means, said gas conduit being interconnected between said sealer plate outlet opening and said porous plug means;

(e) seal holder means disposed in approximate alignment with said sealer plate means for directing said gas received from said gas supply toward the inlet opening in said sealer plate means, said seal holder means having a gas passage therethrough which provides a fluid communication between a holder outlet opening located in a face portion of said seal holder and a inlet opening located in an inlet portion of said seal holder;

(f) spacing means, comprised of an annular-shaped elastomeric member interposed between said seal holder means and said sealer plate means, for providing a selected spaced distance between said sealer plate face portion and said seal holder face portion, and for delimiting the side walls of a substantially gas conduit chamber which conducts said gas directed from said seal holder outlet opening toward into said sealer plate inlet opening when said sealer plate face portion and said seal holder face portion simultaneously contact against opposite end portions of the side walls defined by said spacing means;



(g) a radially extending flange portion connected to a peripheral surface of said seal holder means for guiding and limiting the lengthwise movement of the seal holder means, and said spacing means capable of being offset laterally along a contacting, substantially planar surface of said sealer plate means or of said seal holder means while still maintaining said conduit chamber in operative condition.

(h) a guide retainer for guiding and restricting the movements of said seal holder means, said guide retainer disposed about the seal holder flange portion to slideably engage a side surface of said seal holder means against a mating side surface of said retainer to thereby guide the lengthwise movements of the seal holder, and having a fixed radially extending lip portion, which at least intermittently contacts said seal holder flange portion to limit the lengthwise of said seal holder means;

(i) spring means disposed adjacent to said seal holder means for resiliently urging said seal holder means toward said sealer plate to provide sealing-type contact against said interposed spacing means to maintain said substantially sealed gas conduit chamber; and

(j) guide means for guiding said vessel to position the sealer plate in approximate alignment with said seal holder means.

4,502,671

BATCH ANNEALING APPARATUS

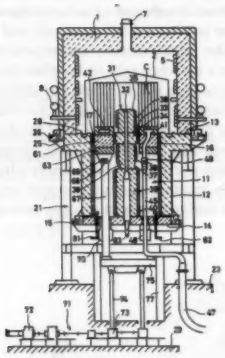
Kiyoharu Omura, Kitakyushu, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

Filed Oct. 14, 1983, Ser. No. 542,193

Claims priority, application Japan, Oct. 30, 1982, 57-190035; Dec. 9, 1982, 57-214692; Mar. 24, 1983, 58-48007; Mar. 24, 1983, 58-41289[U]; Mar. 24, 1983, 58-41290[U]

Int. Cl.³ F27B *11/00*; C21D *9/663*

U.S. Cl. 266—256 9 Claims



1. A batch annealing apparatus for annealing a metal coil, comprising:

a bell-shaped furnace having heating means on the inside of the wall thereof;

a flange around the bottom of said furnace on which said furnace is detachably mounted and having a central opening therein having an inside diameter for permitting the coil to pass snugly thereby;

a detachable inner cover detachably mounted on said flange for covering a metal coil to be annealed and which is positioned in said furnace with the axis thereof vertical;

a bottom insulating chamber extending downwardly from said flange and having a closed bottom for isolating the interior thereof from the surrounding atmosphere and further having an inside diameter of a size for accommodating the metal coil therein and having said flange on the upper end thereof;

a cylindrical stationary base extending axially upwardly from the bottom of said bottom chamber into said inner cover and having a horizontal partition thereon at a point substantially corresponding to the level of said flange to define an annular opening therewith, the partition having an outside diameter for permitting the inside diameter of the metal coil to pass snugly thereby;

an annular base plate having a size for just fitting said annular opening and having cooling means operatively associated therewith;

an elevatable supporting means passing through the bottom of said bottom chamber in sealing engagement therewith and on which said base plate is mounted; and

speed controllable elevating means connected to said supporting means.

4,502,672

SELF PUMPING, HYDROPNEUMATIC, TELESCOPIC, SPRING DAMPING DEVICE WITH INTERNAL LEVEL REGULATION

Theo Meller; Heinz Knecht; Ewald Kohberg, and Karl-Heinz Löhr, all of Eitorf, Fed. Rep. of Germany, assignors to BOGE GmbH, Eitorf, Fed. Rep. of Germany

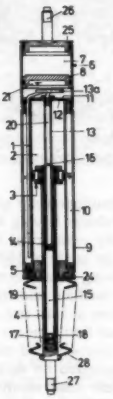
Continuation of Ser. No. 231,725, Feb. 5, 1981, Pat. No. 4,368,878. This application Sep. 20, 1982, Ser. No. 420,289

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1980, 3004307

The portion of the term of this patent subsequent to Jan. 18, 2000, has been disclaimed.

Int. Cl.³ F16F *9/18*

U.S. Cl. 267—64.17 11 Claims



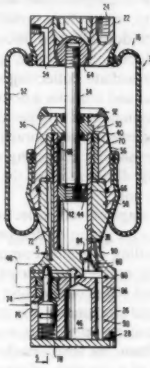
1. A self-pumping, hydropneumatic, telescopic, spring damping device with internal level regulation, especially for automotive vehicles, comprising: a working cylinder with an oil filled working chamber and a working piston slidably borne therein and provided with damping devices, said working piston being carried by a hollow piston rod that passes sealingly from the working cylinder, a gas cushion in a gas spring chamber for pressurizing the oil in the working chamber, an oil reservoir chamber having a free surface between oil and gas in the reservoir, a hollow pump rod having a cavity and borne on a partition, which pump rod is communicated at one end with the oil reservoir chamber below the surface of the oil, said pump rod having a pump suction valve and cooperating with a pump chamber disposed in the hollow piston rod for level regulation, such that as a function of the in and out spring motions oil is delivered from the oil reservoir chamber into the working chamber, a control opening in the pump rod such that, when predetermined conditions are exceeded, oil can flow from the working chamber into the oil reservoir via the control opening, a pump discharge valve disposed in the pump chamber relatively remote from the partition, said pump discharge valve being located in a control sleeve located in the piston rod cavity between the piston rod and the pump rod, said control sleeve forming passages which lead from the pump, discharge valve to the working chamber, the end of said control sleeve toward said partition forming a control edge for said control opening, and a separating body of solid material movably disposed in the gas spring chamber in the region of the interface between oil and gas, said separating body of solid material comprises a separating piston guided by a seal at its periphery in said gas spring chamber, said gas spring chamber being in pressurizing communication with said work chamber via at least one passage in said partition, the partition itself in the region of the working chamber being elastic, a pump tube fluidly communicating the pump rod cavity with the oil reservoir chamber below the surface of the oil, said pump suction

tube being constructed and arranged so as to be yieldable with respect to movement of said partition.

4,502,673
INTEGRAL SHOCK ABSORBER AND SPRING ASSEMBLY

Ray Clark, Pewaukee, Wis., assignor to Applied Power Inc., Milwaukee, Wis.

Filed Feb. 11, 1982, Ser. No. 348,133
Int. Cl.³ F16F 9/22
U.S. Cl. 267—64.24 11 Claims



1. An integral shock absorber and spring assembly comprising:

a first base;

a rod projecting from said first base;

a second base;

a cylinder projecting from said second base, said cylinder being closed at the end remote from said second base by a cap through which said rod slidingly projects;

a piston carried by said rod within said cylinder, said piston dividing the interior space of said cylinder into a first bore which decreases in volume during the upstroke of said piston in said cylinder and a second bore which decreases in volume during the downstroke of said piston in said cylinder;

a hydraulic fluid circuit comprising

a reservoir for hydraulic fluid,

a first path of fluid communication through said piston;

a second path of fluid communication through said cylinder and positioned near an end of said cylinder towards which said piston is directed during an upstroke and operably connected to said reservoir, said second path of fluid communication having a plurality of axially-spaced openings whereby the effective cross-sectional area of the sum of said openings is reduced as said piston nears the end of an upstroke, said second paths of fluid communication permitting a slower flow rate than said first path of fluid communication, and

a third path of fluid communication through said cylinder and positioned near an end of said cylinder towards which the piston is directed during a downstroke and operably connected to said reservoir, said third path of fluid communication having a plurality of axially spaced openings whereby the effective cross-sectional area of the sum of said third path of fluid communication is reduced as said piston nears the end of its downstroke, and wherein said third path of fluid communication permits a slower flow rate during the downstroke of said piston than said first path of fluid communication so that during an upstroke fluid will be directed from said first fluid pathway through said second fluid pathway to said reservoir and from said reservoir through said third pathway of fluid communication and into said second bore, and during a piston downstroke, fluid exits said second bore through said first path of fluid communication in said piston;

a one-way valve positioned in said first path of fluid communication which permits flow toward said first bore but does not permit flow in the opposite direction;

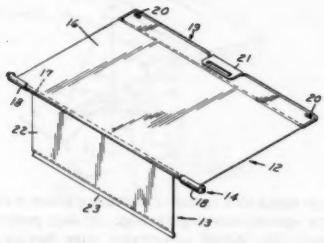
a remotely adjustable control valve positioned in said hydraulic fluid circuit; and

a spring surrounding said rod and said cylinder connected at one end to said first base and disposed to hold said piston at an intermediate position in said cylinder.

4,502,674
AUTOMOBILE COMPARTMENT COVER WITH DROP PANEL

James E. White; Mark Lobanoff, both of Troy, and Robert A. Harris, Novi, all of Mich., assignors to Irvin Industries, Inc., Troy, Mich.

Filed Mar. 18, 1983, Ser. No. 476,598
Int. Cl.³ B60R 5/04
U.S. Cl. 296—37.16 5 Claims



1. An automobile rear compartment cover assembly comprising roller means including installation mounting means providing roller windup bias, rollable main cover and drop panel means connected at their respective inner ends to said roller means for conjoint rollup and extraction, said drop panel means being relatively shorter so as to become enveloped completely within said main cover upon full retraction, said main cover including outer end means to limit retraction and to facilitate manual extraction, said drop panel means including rigid outer end means adapted to allow rolled up retraction within said main cover and to facilitate parting from said main cover during its manual horizontal extraction.

4,502,675
LONGITUDINAL FOLDING OF WEBS, FOLDING BOARD SYSTEM THEREFOR

Gerald L. Clark, Gwinnett County, and Terry P. Ford, Cherokee County, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

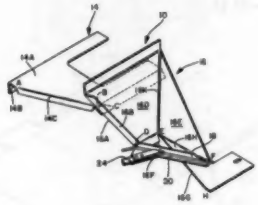
Filed Jul. 15, 1983, Ser. No. 514,068
Int. Cl.³ B41L 1/30
U.S. Cl. 270—40 8 Claims

1. An improved folding board system for longitudinally folding a moving flexible material web into four equal sections virtually free of undesirable wrinkles in the face of the folded sections, said system providing a balance profile of lateral and longitudinal tension forces upon each section of the web during transitions of the web through said system, said system including a support structure; a secondary folding board disposed on said support structure for initiating folding a first section of the web along a first fold line, said secondary board being positioned in the path of said moving web such that a central axis of said secondary board substantially divides the web in half; the web being moved along a substantial horizontal plane; a primary folding board also disposed on said support

structure downstream on an incline from and in alignment with said secondary board for folding a fourth section of the web under a third section of the web, and for cooperating with said secondary folding board to form a double-folded half of the moving web by folding the first section of the web onto the second section of the web as the web moves passed a first converging edge of the primary folding board; and a folding rod disposed at a chosen angle, adjacent to said primary folding board for guiding the double-folded half of the web onto the third section of the web after the third section emerges from under said primary folding board resuming travel in a horizontal plane, forming four substantially equal folded sections in the "W" type fold configuration; said improvement comprising:

a. a diverting edge of said secondary folding board disposed to be in alignment with said folding rod for initiating the fold of the first section of the web;

b. a first flange depending from the first converging edge of said primary folding board at a chosen elevated angle having a radius of curvature along said first converging



edge equal to a radius of curvature about a complementary second converging edge of said primary folding board, the second converging edge having an obtuse triangular-shaped guide plate depending therefrom at a chosen angle which complements the elevated angle of said flange for initiating folding the fourth section under the third section, said first flange permitting smooth passage of the double-folded half of the web passed the primary folding boards; and

c. a separating means disposed between said folding rod and said first converging edge of said primary folding board for displacing the first section from the second section of the double-folded half of the web as the double-folded half of the web is guided into overlaying relationship with the third section, said separating means also serving to maintain the surface contour of the first and second sections of the moving web substantially fully expanded in both the cross machine and the machine direction in a manner opposing undesirable drag forces between the double-folded half of the web and said folding rod.

4,502,676

DOCUMENT HANDLING MACHINE WITH DOUBLE COLLECTOR AND METHOD OF OPERATION

Lester H. Stocker, Phillipsburg, N.J., assignor to Bell & Howell Company, Phillipsburg, N.J.

Filed Aug. 31, 1981, Ser. No. 297,535

Int. Cl.³ B42C *1/00*

U.S. Cl. 270—45 **11 Claims**

1. A method of operating a document handling machine comprising the steps of:

conveying at least two strips of documents, each of said strips comprising a plurality of documents, each of said documents having a portion thereof which will be a trailing edge upon eventual separation of said document from its strip, each of said documents belonging to one of a plurality of groups with documents in each group being related by a common intended packaging, said strips being conveyed over one another in a direction of superimposition whereby the trailing edges of documents of one strip alternate in sequence in the direction of conveyance with the trailing edge of documents in another strip, said strips comprising documents in a manner whereby during said conveyance the trailing edges of all documents in a preceding group are encountered in the direction of conveyance before trailing edges of documents in a following group are encountered;

feeding said strips of documents arranged one over another to separating means whereby in alternating fashion leading documents in each of said strips are separated from said strips of documents;

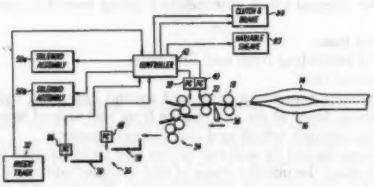
reading indicia on a document after said document is separated form its strip, said indicia providing an indication as to which group of documents a document belongs;

transporting said document through a collector assembly including an intermediate collecting stage through which all documents pass and wherein a document is temporarily retained if said document is not associated with a preceding group of documents; temporarily retaining a document in said intermediate collecting stage based upon its read indicia being different than the read indicia of the preceding group; and,

collecting in a final stage of said collector assembly all documents belonging to a group of documents.

7. A document handling machine comprising:

conveying means for conveying at least two strips of documents, each of said strips comprising a plurality of documents, each of said documents having a portion thereof which will be a trailing edge upon eventual separation of said document from its strip, each of said documents belonging to one of a plurality of groups with documents



in each group being related by a common intended packaging, said strips being conveyed over another in a direction of superimposition whereby the trailing edges of documents of one strip alternate in sequence in the direction of conveyance with the trailing edges of documents in another strip, said strips comprising documents in a manner whereby during said conveyance the trailing edges of all documents in a preceding group are encountered in the direction of conveyance before trailing edges of documents in a following group are encountered;

separating means downstream from said conveying means for separating in alternating fashion leading documents from each of said strips of documents;

means for reading an indicia on a document after said document is separated from its strip, said indicia providing an indication as to which group of documents a document belongs;

collecting means through which said document is transported after separations from its strip, said collecting means further comprising:

an intermediate collecting stage through which all documents pass and wherein a document is temporarily retained if said document is not associated with a preceding group of documents; means for temporarily retaining a document in said intermediate collecting stage based upon its read indicia being different than the read indicia of the preceding group; and,

a final collecting stage for collecting documents belonging to said preceding group of documents; and,

means for transporting said documents through said collecting means.

4,502,677

METHOD FOR FEEDING RECORDING SHEET MATERIALS

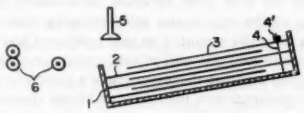
Takao Senga; Shigeyoshi Suzuki; Jun Yamada, and Sadao Kuriu, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo and Dainippon Screen Mfg., Co., Ltd., Kyoto, both of, Japan

Filed Sep. 24, 1982, Ser. No. 423,302

Claims priority, application Japan, Nov. 26, 1981, 56-189698; Jul. 8, 1982, 57-118923

Int. Cl.³ B65H *3/34*

U.S. Cl. 271—104 **12 Claims**



1. A method for feeding image recording sheet materials comprising the steps of:

piling up alternately on a tray a plurality of image recording sheet materials, each of which has a relatively hard support, and a plurality of spacing sheets with each image recording sheet material and each spacing sheet having a leading edge, the leading edge of said image recording sheet material protruding beyond said leading edge of adjacent spacing sheets and with said image recording sheet materials and said spacing sheets each having trailing edge portions with said trailing edge portions of said spacing sheets protruding beyond the trailing edge portions of said image recording sheet materials;

fixing said protruded trailing edge portions of each said spacing sheet whereby said spacing sheets are not fed when said image recording sheet materials are fed;

holding a said protruding leading edge portion of a said image recording sheet material by a feeding means;

and feeding only said image recording sheet materials by said feeding means to a subsequent position.

4,502,678

SHEET ACCELERATING DEVICE

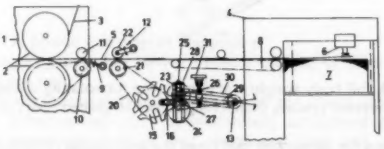
Josef Marass, Seehausen, Fed. Rep. of Germany, assignor to Georg Spiess GmbH, Gersthofen, Fed. Rep. of Germany

Filed Feb. 11, 1982, Ser. No. 347,880

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1981, 3107807

Int. Cl.³ B65H *5/24, 5/34, 5/20, 9/9*

U.S. Cl. 271—270 **10 Claims**



1. A device for accelerating sheets aligned on front lay marks of a feeding attachment, the sheets being fed independent of their size, in uninterrupted, overlapping succession with a processing machine or similar device, whereby an advancing unit associated with the front lay marks is operated in timed relation with the feeding attachment, and is driven by a single-revolution shaft of the feeding attachment together with an intermediate gear that produces acceleration or slowing down of the feeding attachment in respect of the single-revolution shaft for every one of the shaft's revolutions, wherein the intermediate gear has a step-by-step motion gear with a step-by-step moving element connected in rotational engagement with the advancing unit, and a rotating element coming cyclically into positive, sliding engagement with the step-by-step moving element, which itself is driven via a control gear that has two gear parts adjustable, together with their axes, in a radial direction in relation to each other and found in positive engagement with each other and, of which, one part is in rotational engagement with the rotating element of the step-by-step motion gear and the other in rotational engagement with the single-revolution shaft of the feeding attachment; and wherein the distance advanced by the advancing unit, which corresponds to one step of the step-by-step motion gear, at least corresponds to the distance between the front lay marks and the front-feed unit of the processing machine.

4,502,679

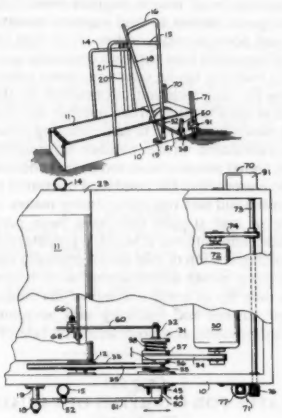
MOTORIZED VARIABLE SPEED TREADMILL

Fred De Lorenzo, 26B Coromar Dr., Goleta, Calif. 93117

Filed Sep. 21, 1982, Ser. No. 420,860

Int. Cl.³ A63B *23/06*

U.S. Cl. 272—69 **10 Claims**



1. In a treadmill having a frame, an endless belt carried in said frame on rollers, a first motor for driving said endless belt, and lever means pivotted to said frame for controlling the speed of said endless belt, the improvement comprising in combination:

a rod mounted in said frame and spaced parallel to said rollers and motor for translating perpendicular to said rollers;

a variable pulley unit carried on said rod for rotation on said rod,

said variable pulley unit having means defining first and second grooves of variable widths, with the width of said first groove varying inversely with the width of said second groove; a first drive belt coupling said first motor and first groove;

a second drive belt coupling said second groove and one of said endless belt rollers;

an elongate brake member mounted in said frame perpendicular to said rod and said rollers and having first and second ends with said first end connected to said rod for translation with said rod to maintain said rod in the position selected by the user;

a brake shoe unit mounted in said frame, with said second end of said brake member sliding in said brake shoe unit

when moved by the user and for holding the brake member and rod in the adjusted position; and

means for coupling said lever means to said rod for translating said rod in said frame and thereby said brake member.

4,502,680

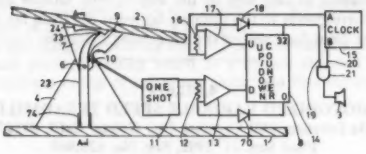
FOOT EXERCISER

Alvin S. Blum, 2350 Del Mar Pl., Fort Lauderdale, Fla. 33301, and James W. Dickey, Jr., 3018 N. Atlantic Blvd., Fort Lauderdale, Fla. 33308

Filed Dec. 23, 1982, Ser. No. 452,766

Int. Cl.³ A61H *1/02*

U.S. Cl. 272—96 **20 Claims**



1. An exerciser for improving fluid circulation, comprising: at least one foot pedal means; support means; joining means joining said pedal means to said support means pivotally to permit up and down motion strokes of the foot by flexion and extension of the ankle joint through contraction and relaxation of lower leg muscles; stroke counting means connected to said pedal means for accumulating information on the number of said strokes as accumulated stroke number information; reductive timing means connected to said counting means for reducing said accumulated stroke number information at a time related rate; signal means connected to said counting means for signalling to a user when the combined operation of said stroke counting means and said reductive timing means indicates that the number of said strokes that have been performed in a predetermined time interval is below a predetermined amount, said combined operation of said stroke counting means and said reductive timing means accumulating said motion strokes as they occur only up to a predetermined maximum number of accumulated strokes and reducing said accumulated stroke number of information at a predetermined rate of strokes.

4,502,681

APPARATUS FOR CARRYING OUT QUADRICEPS TRAINING

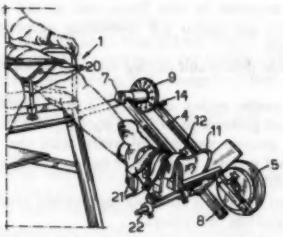
Olle Blomqvist, Artillerigatan 38, S-114 45 Stockholm, Sweden

Filed Aug. 6, 1981, Ser. No. 290,711

Claims priority, application Sweden, Aug. 8, 1980, 8005618

Int. Cl.³ A63B *21/02*

U.S. Cl. 272—142 **10 Claims**



1. An apparatus for quadriceps training of a movement-disabled person where the lower leg is pivoted relative to the knee joint, said apparatus including seating means for seating the person so that at least one of the person's lower legs is free to pivot with the knee joint serving as a pivot axis, a resistance arm having one end mounted on a pivot axis for rotation thereabout and connected to a weight to impart a torque to said resistance arm, said pivot axis of said resistance arm being substantially parallel to but displaced from the pivot axis of the knee joint of a user when the user is using the apparatus, said resistance arm having attachment means for attaching the lower leg of a person adjacent his foot or ankle to said resistance arm, with a point on the resistance arm which, in one of the angular positions of the resistance arm, registers with a point on the foot of the person but with the point of the resistance arm moving away from the point on the foot upon rotation of the foot around the knee joint pivot axis and upon rotation of the resistance arm about its pivot axis due to the mutual paralleldisplacement of the said pivot axes, the improvement comprising means for the strapping of the upper leg of the person on said seating means in such a position that the pivot axis of the knee joint becomes substantially stationary with respect to the seat means, said resistance arm including lever means pivotally mounted on said resistance arm adjacent the end opposite said one end of said resistance arm, said attachment means securing the lower leg of a person to said lever means, said resistance arm including an elastic traction means for exerting a traction force on the leg through said lever means during the rotation of a user's leg on the pivot axis of the knee joint from a bent condition to an extended substantially straight condition in the longitudinal direction of the lower leg.

4,502,682

FULL BODY WEIGHT TRACTION DEVICE

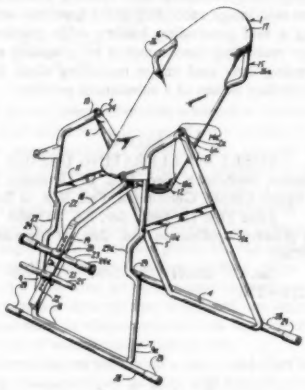
Jack V. Miller, Sierra Madre, Calif., assignor to Gravity Guidance, Inc., Duarte, Calif.

Continuation-in-part of Ser. No. 291,064, Aug. 7, 1981, Pat. No. 4,410,176. This application Dec. 6, 1982, Ser. No. 446,996

The portion of the term of this patent subsequent to Oct. 18, 2000, has been disclaimed.

Int. Cl.³ A63B *17/00*

U.S. Cl. 272—144 **9 Claims**



1. A full body weight traction device for rotating a human into inverted posture comprising a pair of spaced apart pivot pins;

means for supporting said pivot pin in a coaxial relationship parallel to and spaced above a floor surface, said means including a generally U-shaped rear leg wherein the base of the U rests on the floor and the sides of the U are upstanding and have pivot pin bearings in the respective tips, and said means further including a generally U-shaped front leg wherein the base of the U rest on the floor and the sides of the U are generally upstanding with portions thereof being spaced closer together than the

sides of the rear leg, the sides also having pivot pin bearings in the respective tips, the pivot pin bearings of each respective side of the front and rear legs being joined by one of the pivot pins, and the lower portions of the front and rear legs being held in a spaced relationship by tension means;

a tilt bed disposed between said pivot pins and pivotally mounted therein at its approximate mid-point by a generally U-shaped trunion wherein the tilt bed rests on and is attached to the base of the U and the legs of the U are generally upstanding and have pivot pin bearings in the respective tips, the pivot pin bearings being further joined by the respective pivot pins joining the respective sides of the front and rear legs;

a human torso supporting means on said tilt bed so sized and configured generally to match to the size of a human torso;

a beam extending from the lower end of said torso supporting means and terminating in an elongated rail disposed between the ankles of a human user;

a foot supporting means slidably attached to said rail with selectable fixed locations along the rail; and

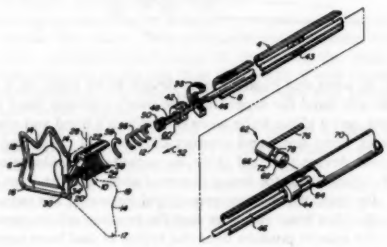
a portion of the torso supporting means on each side which is configured to be narrower in width than the spacing between the rear leg sides and wider than the spacing between the front leg sides, whereby the tilt bed is free to rotate on its bearings through the rear leg space to be stopped in the inverted position by the front leg sides.

4,502,683

PIVOTAL CUE SUPPORT

Steve Lobrovich, 41939 McKay St., Fremont, Calif. 94538

Filed Jan. 17, 1983, Ser. No. 458,406
Int. Cl.³ A63D *15/10*
U.S. Cl. 273—23 **8 Claims**



1. A pivotal cue support comprising:

an elongate handle having a handle end and an outer end;

a cue rest;

means for pivotally mounting said cue rest to said outer end allowing said cue rest substantially unhindered pivotal movement along at least one pivotal path, said pivotal mounting means including a brake surface; and

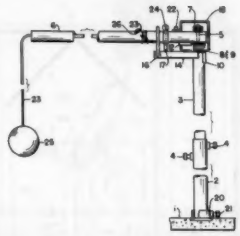
means for selectively locking said cue rest at a chosen pivotal orientation with respect to said handle said locking means including a brake pad, means for resiliently biasing said brake pad away from said brake surface, and remotely actuated drive means for urging said brake pad against said brake surface to lock said pivotal mounting means and cue rest therewith at said chosen pivotal orientation.

4,502,684

BATTING PRACTICE DEVICE FOR BASEBALL

Emilio Rocha, 1402 Fredericksburg Rd., San Antonio, Tex. 78201

Filed Jun. 13, 1983, Ser. No. 503,596
Int. Cl.³ A63B *69/40*
U.S. Cl. 273—26 E **3 Claims**



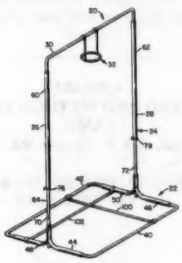
1. In a batting practice for baseball, a base member, telescoping vertical shaft members mountable on said base member, a laterally extended arm rotatably mounted on said shaft member, means for maintaining said arm in a central position, a yieldable strap having one end mounted on said arm and a baseball mounted on the other end of said strap, means for resisting lateral movement of said laterally extended arm and means for limiting said movement in either direction, said means for resisting lateral movement of said arm having a pair of concentrically mounted springs, the end of which are mounted on said vertical shaft, and on said laterally extended arm, respectively.

4,502,685

TENNIS SERVE PRACTICE DEVICE

Vanice C. Phillips, 2401 Shady Grove, Bedford, Tex. 76021, and Glendale Phillips, R.R. 2, Box 708, Scurry, Tex. 75158

Filed Sep. 21, 1981, Ser. No. 304,117
Int. Cl.³ A63B *61/00*
U.S. Cl. 273—29 A **13 Claims**



1. A tennis serve practice device comprising:

an overhead bar supported a predetermined distance from a ground surface; and

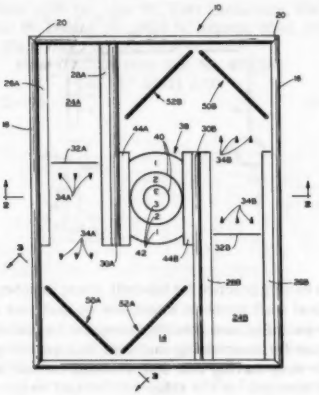
a rigid target device, supported from said overhead bar, including

a circular hoop having a pair of legs extending sustantially perpendicularly from the plane of the hoop and having curved ends opposite said hoop for engagement around said overhead bar, said curved ends extending substantially around said overhead bar to prevent disengagement of said target device from said bar while permitting free swinging movement and free sliding longitudinal movement of said target device on said bar.

4,502,686
SYMMETRICAL FOLDED ALLEY GAME BOARD

Donald E. Iiams, Jr., 6201 Garden Rd., No. G-124, Maumee, Ohio 43537

Filed Apr. 11, 1984, Ser. No. 599,273
Int. Cl.[3] A63D 3/00; A63F 7/00
U.S. Cl. 273—126 R 19 Claims

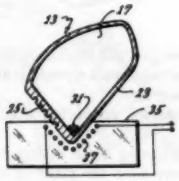


1. An amusement game comprising, in combination, a generally planar surface defining a pair of opposed, symmetrically disposed parallel alleys extending between opposed ends of said planar surface, each of said alleys having a pair of gutters disposed on respective sides of said alley and extending along a portion of said alley, a barrier disposed adjacent at least one of said gutters on the side of said gutter opposite said alley, a central scoring region disposed generally intermediate said parallel alleys, a pair of gutters disposed generally adjacent said scoring region and parallel to said alley gutters and a pair of resilient barrier assemblies associated with each of said alleys, one of each of said pair of barrier assemblies disposed generally in alignment with and extending generally across one of said alleys in a region generally away from said gutters and the other of each of said pair of barrier assemblies disposed generally at a right angle to said one of said pair of barrier assemblies.

4,502,687
GOLF CLUB HEAD AND METHOD OF WEIGHTING SAME

Rudolph J. Kochevar, 638 W. Duarte Rd., Suite 19, Arcadia, Calif. 91006

Filed May 24, 1983, Ser. No. 497,424
Int. Cl.[3] A63B 53/08
U.S. Cl. 273—171 19 Claims



1. A method of weighting a hollow golf club head having a wall defining an interior chamber and a hosel leading to such chamber, said method comprising:

introducing a weight composition of the desired weight in a solid state into the chamber with the weight composition being sticky in the solid state;

heating the club head and weight composition to an elevated temperature to render the weight composition flowable and to enhance the stickiness of the weight composition; and

cooling the weight composition to a solid state to strongly adhere the weight composition to the wall of the chamber to such an extent that the weight composition is not likely to release from the wall during normal use of the golf club head.

11. A weighted golf club head comprising:

a hollow golf club head having a wall defining an interior chamber which extends throughout said head and a hosel leading to the chamber;

an adhesive weight composition which is sticky in the solid state and cured in situ, said weight composition being strongly adhered by the adhesive quality of the weight composition to the wall of the chamber to such an extent that the weight composition is not likely to release from the wall during normal use of the golf club head;

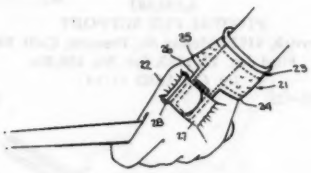
the volume of the weight composition in the chamber being less than the volume of the chamber whereby there is a gap between a major region of the weight composition and the wall of the chamber; and

the weight composition being at least somewhat pliable in the solid state.

4,502,688
WRIST AND HAND SUPPORT DEVICE

Robert G. Papp, 121 Clapboard Rd., Danbury, Conn. 06810

Continuation-in-part of Ser. No. 337,700, Jan. 7, 1982, abandoned. This application Mar. 18, 1983, Ser. No. 476,498
Int. Cl.[3] A63B 69/36
U.S. Cl. 273—189 A 1 Claim



1. A wrist and hand support device to be worn on a user's wrist and hand for supporting the user's arm and hand movements, and a glove to be worn on the user's hand and attached to said wrist and hand support device, said wrist and hand support device and said glove comprising in combination;

A. a wristband for being disposed about a wrist joint about the area of the transverse carpal ligament, the radius and the ulna bone structure and the brachioradialis muscle at the muscle position over the radius at said bone structure at said wrist, and wristband having

1. a hook and loop means for adjustably securing said wristband about said wrist joint;

2. a flexible support member projecting from said wristband and having sufficient stiffness for placement, specific positioning and providing support against a part of the back portion of said hand during use of said device, the support member projecting in a position extending from over the area of said brachioradialis muscle at said muscle over said radius bone at said wrist, over said transverse carpal ligament and along and over the second metacarpal, terminating substantially at the first knuckle of the index finger;

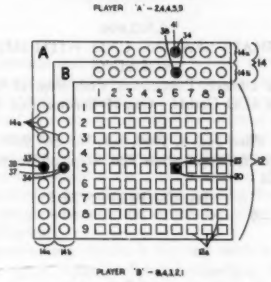
3. said flexible support member includes a top surface and attached thereto a hook means and a bottom surface having attached thereto a loop means; and

B. a glove adapted to be attached to said wrist and hand support device, said glove having
1. a back portion that contacts the surface of the back of the user's hand;
2. a flap means attached to said glove for adjustably securing said glove about said hand;
3. a hook means on said back portion surface for securing said bottom surface's loop means of said flexible support member; and
4. a loop means on the bottom surface of said flap means for securing said top surface's hook means of said flexible support member;
whereby said flexible support member is interposed and affixed between said top surface of said glove and said bottom surface of said flap.

4,502,689
APPARATUS AND METHOD FOR PLAYING A BOARD GAME

Wojih Y. Al-Harari, c/o Zaki Al-Harari, P.O. Box 1343, New York, N.Y. 10025

Filed Sep. 22, 1983, Ser. No. 534,972
Int. Cl.³ A63F 3/00
U.S. Cl. 273—265 **10 Claims**



1. A method of playing a game in which a sequence of characters is selected by a first player and determined by a second player, comprising the steps of:
selecting an ascending or descending sequence of characters, by said first player, of a predetermined maximum length from a predetermined range of characters, the length of said sequence being less than the length of said range;
communicating said selected length by said first player to said second player;
initiating an attempt, by said second player, to determine said sequence of characters by communicating to said first player a pair of characters from said range;
communicating by said first player to said second player whether each of said pair of characters is included in said sequence and whether either begins or ends said sequence; and
continuing said attempt by repeating the next preceding two steps until said second player determines said selected sequence of characters.

4,502,690
JAI-ALAI CESTA

Winfred M. Ruperto, 47 El Camino Real, Burlingame, Calif. 94010

Filed Feb. 7, 1983, Ser. No. 464,157
Int. Cl.³ A63B 59/02
U.S. Cl. 273—326 **23 Claims**

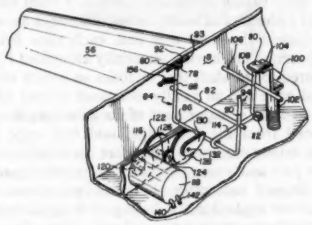
1. An apparatus for catching and throwing projectiles comprising:
handle means for grasping said apparatus; and
a scoop for catching and throwing said projectile, said scoop having a pair of semi-parabolic sides interconnected one with the other along one edge by a curved ramp surface which tapers into a shallow arched surface toward one end of the scoop means forming an extended lip portion, at the other end of the scoop the ramp surface continues until

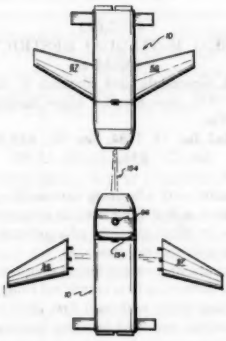
it joins the other edge of each of said sides, said handle means being affixed to said other end of the scoop with the other edges of each of said sides being bifurcated extensions of said handle means.

4,502,691
DESTRUCTIBLE TOY AIRCRAFT GAME

Raymond W. Ratliff, 4501 Ratliff La., P.O. Box 395, Addison, Tex. 75001, and Eugene E. Smith, 2033 Oates Dr., Dallas, Tex. 75228

Filed Dec. 23, 1983, Ser. No. 564,822
Int. Cl.³ A63F 9/02
U.S. Cl. 273—349 **18 Claims**





1. A destructible toy aircraft game, comprising:
(a) a body having generally the shape of an aircraft fuselage and including a pair of sides;
(b) a pair of wings removably mounted to said body, one of said wings mounted to each of said sides;

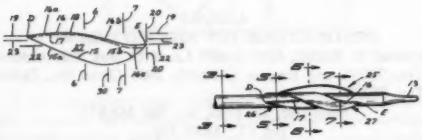
(c) latch means associated with each of said wings for removably mounting said wings;
(d) release means operatively associated with said latch means cooperating with said latch means for securing said wings to said body when in a first latch position and for releasing said wings from said body when in a second release position;
(e) motive means disposing said release means in said release position from said latch position; and,
(f) fluid pressure responsive means cooperatively engaged with said motive means for activating said motive means upon application of pressurized fluid for disposing said release means from said latch position to said release position whereby said wings being released from said body thereby.

4,502,692

ARCHERY ARROW HAVING PLASTIC VANES

Stanley A. Humphrey, 3212 Third Avenue South, Minneapolis, Minn. 55408

Filed Aug. 13, 1984, Ser. No. 639,732
Int. Cl.³ F41B *5/02*
U.S. Cl. 273—423 **19 Claims**



1. An arrow that includes an axially elongated arrow shaft having a central axis, a peripheral surface, a front end and a rear end, and a plurality of axially elongated vanes mounted on the shaft adjacent the shaft rear end, each vane being of a semi-rigid material and having an axially elongated first edge portion secured to the shaft that includes an axially elongated first terminal edge and an axially elongated second edge that throughout at least a major part of its axial length is transversely spaced from the first edge, said first edge portion including an axially elongated front part, an axially elongated intermediate part and a rear part, said intermediate part along the length thereof extending along the peripheral surface through a greater angle than the front part along its length and extending angularly rearwardly different from the angular extent of the front part along the length thereof.

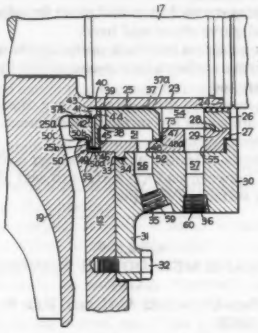
4,502,693

BUSHING SEAL WITH DUAL RESTRICTED FLUID PASSAGES

Gerald Lesiecki, Greendale, and Kenneth E. Kraemer, Brookfield, both of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Jul. 19, 1984, Ser. No. 632,309
Int. Cl.³ F16J *15/40, 15/50*
U.S. Cl. 277—3 **10 Claims**

1. In combination with a housing surrounding a rotary member extending from a first fluid area to a second fluid area;
sealing means for blocking flow of a process fluid from said first area to said second area;
said sealing means and said rotating member having opposing surfaces defining a first restricted fluid passage in fluid flow communication with said first fluid area;
said sealing means and said housing having opposing surfaces defining a second restricted fluid passage in fluid flow communication with said first fluid area;
means for admitting a flow of a sealing fluid to said first restricted passage at a pressure higher than a pressure of said process fluid when said member is not rotating;
pumping means for increasing the pressure of at least a portion of said sealing fluid within said first restricted passage to a pressure in excess of the pressure of said process fluid when said member rotates; and



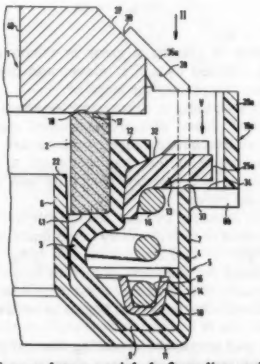
means for admitting at least a portion of said increased pressure portion of said sealing fluid to said second restricted passage.

4,502,694

AXIAL SHAFT SEALING UNIT WITH IMPROVED HOUSING

Klaus-Jürgen Uhrner, Leingarten, Fed. Rep. of Germany, assignor to KACO GmbH + Co., Heilbronn, Fed. Rep. of Germany

Filed Jan. 4, 1984, Ser. No. 567,959
Claims priority, application Fed. Rep. of Germany, Jan. 4, 1983, 3300064
Int. Cl.³ F16J *15/36*
U.S. Cl. 277—9 **17 Claims**



1. A slide ring seal as an axial shaft sealing unit for sealing rotating machine components, said seal comprising:
a housing, which includes an axial stop limitation;
a primary seal, which is in the form of a slide ring and is disposed in said housing;
a bellows-like secondary seal disposed in said housing;
at least one spring disposed in said housing in such a way as to axially fix said secondary seal relative to said slide ring; and
a counter ring as a separate part which is provided with an axially extending inner wall, and with a slide face on which said slide ring bears; at least that portion of said counter ring which is provided with said slide face being adapted to be secured via said axially extending inner wall directly on said rotating machine component with force fit

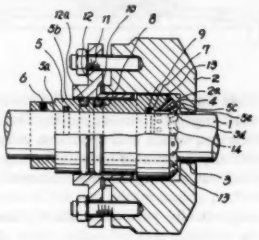
subject to avoidance of any separator therewith; said counter ring furthermore being associated with said axial stop limitation connected integrally with said housing.

4,502,695

MECHANICAL SEAL WITH FLUID FLOW-REVERSING MEANS

Kyu-Hwan Choi, 438-1, Namoi-Dong, Ulsan, Kyungsangnam-Do, Rep. of Korea

Filed Sep. 20, 1983, Ser. No. 533,916
Int. Cl.³ F16J *15/40*
U.S. Cl. 277—12 **6 Claims**



1. A mechanical seal for reversing a flow of fluid leakage between a rotational shaft and an inner wall of a stuffing box in a centrifugal pump, comprising:

a cylindrical flow-reversing impeller secured to said shaft for rotation simultaneous with said shaft rotation, and

at the front end of said impeller, a flow-reversing means, disposed in a space defined between said shaft and said inner wall of said stuffing box, for causing flow reversal of fluid leakage which would otherwise occur around said shaft, wherein

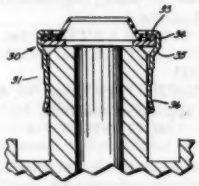
said flow-reversing means is formed with a plurality of leakage spray holes perforated angularly from a front internal face of said flow-reversing impeller toward an external face thereof.

4,502,696

VALVE SEAL RETAINER WITH MULTIPLE DIAMETER BOOT BASE

James A. Kammerand, Holland, Mich., assignor to K-Line Industries, Inc., Holland, Mich.

Filed Jul. 2, 1984, Ser. No. 627,071
Int. Cl.³ F16K *41/00*; F16J *15/32*
U.S. Cl. 277—12 **7 Claims**



1. In a valve seal assembly for preventing excessive quantities of oil from leaking between valve guides and valve stems in an internal combustion engine, said valve seal assembly having a valve seal and a boot for retaining said valve seal around a valve stem immediately above the valve guide, said boot telescopically engaging valve guide exposed shoulders having diameters ranging from a maximum positive deviation from a nominal diameter to a maximum negative deviation from a nominal diameter, said boot having a tubular base the diameter of which has an acceptable retention stretch limit, the improvement comprising:

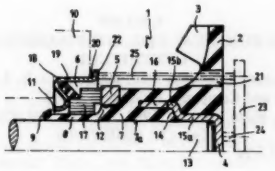
a boot having a tubular base including at least two contiguous segments of progressively narrowing diameters, the largest of said segments being closest to the valve seal, the smallest of said segments being furthest from said valve seal, wherein said largest diameter segment can accommodate within its acceptable retention stretch limit an exposed shoulder with the largest positive deviaton from a nominal diameter, wherein said smallest diameter segment can accommodate within its acceptable retention stretch limit an exposed shoulder with the largest negative deviation from a nominal diameter, and wherein segments of intermediate diameters, if any, can accommodate within their acceptable retention stretch limits an exposed shoulder with a diameter intermediate the maximum positive and negative deviations from nominal diameters.

4,502,697

COMPACT INTEGRATED FACE SEAL UNIT

Werner Heinl, Burscheid, Fed. Rep. of Germany, assignor to Goetze AG, Fed. Rep. of Germany

Filed May 17, 1984, Ser. No. 611,153
Claims priority, application Fed. Rep. of Germany, May 18, 1983, 3318078
Int. Cl.³ F16J *15/38*
U.S. Cl. 277—41 **8 Claims**



1. A sealing arrangement for a machine having a shaft, comprising:

a hub constructed to be seated on the shaft;

an impeller wheel connected to said hub;

a counter-ring disposed axially of said impeller wheel and cooperating with said impeller wheel;

a slide ring seal disposed axially of said counter-ring with said counter-ring being located between said slide ring seal and said impeller wheel; and

a connecting element comprised of the same material as, and integral with said impeller wheel, said connecting element presenting a circumferential face of said sealing arrangement, and extending in the axial direction of said impeller wheel and axially holding together said impeller wheel, hub, counter-ring and slide ring seal.

4,502,698

ROTARY FACE SEAL WITH FLEXIBLE ANNULAR BOOT

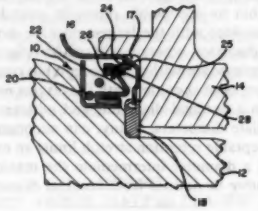
Michael T. Collins, Boulder, Colo., assignor to P and C Engineering and Development, Boulder, Colo.

Filed Jul. 20, 1984, Ser. No. 633,045
Int. Cl.³ F16J *15/36*
U.S. Cl. 277—43 **15 Claims**

1. In a seal assembly wherein an annular member is disposed in outer spaced concentric relation to an inner member, one of said inner and outer members being movable rotatably and axially with respect to the other of said inner and outer members, an outer retaining member disposed in a recessed portion at one end of said outer member having a radially directed flange merging with an outer axially directed flange, and a second retainer portion on said inner member having a radially directed flange portion, the improvement comprising:

a flexible boot of annular, generally S-shaped cross-sectional configuration having an inner seating portion mounted in sealed, surrounding relation to said inner member, said boot terminating in an outer rim portion;

a seal ring defining a radially outward extension of said outer



rim portion of said boot, said seal ring having an outer retaining member-engaging surface contacting with said outer retaining member; and

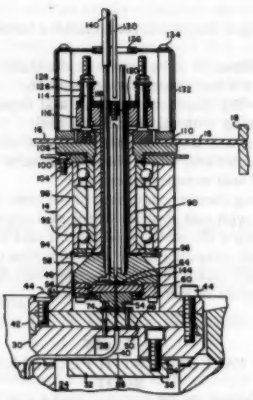
bias means interposed between said inner member and said seal ring to urge said seal ring against said outer retaining member.

4,502,699

ROTATING SEAL FOR CONTINUOUS FLOW CENTRIFUGE

Sushim Mukerji, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 16, 1983, Ser. No. 494,976
Int. Cl.³ B04B *11/00*
U.S. Cl. 277—74 **10 Claims**



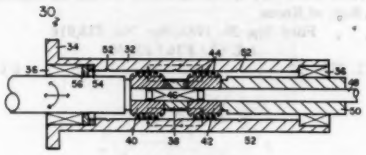
1. In a continuous flow centrifugal apparatus having a housing and a rotor mounted on a drive shaft for rotation within said housing about the axis of said drive shaft, and a rotating seal assembly having interengaged rotating and nonrotating members for conveying fluids to and from said rotor, said members each having corresponding communicating passages for conveying said fluids, the improvement wherein said assembly is flexibly mounted to said housing to permit axial and transaxial movement of said assembly where said flexible mounting includes a resilient sheet whose periphery is secured to the housing and whose interior is secured to the seal assembly.

4,502,700

FERROFLUID LINEAR SEAL APPARATUS

Hanumaiah L. Gowda, Nashua, and Kuldip Raj, Merrimack, both of N.H., assignors to Ferrofluidics Corporation, Nashua, N.H.

Filed May 3, 1984, Ser. No. 606,585
Int. Cl.³ F16J *15/40, 15/56*
U.S. Cl. 277—80 **19 Claims**



1. A ferrofluid linear seal apparatus to provide a hermetic seal about a shaft engaged in linear motion between a first and second environment, which seal apparatus comprises:

(a) a magnetically-permeable housing having a one end and another end and having an inner diameter and an inner surface;

(b) a nonmagnetically permeable shaft element extending within the housing and extending from the one to the other end of the housing;

(c) an annular permanent magnet about the shaft element in the housing;

(d) an annular, first, magnetically-permeable pole piece about the shaft element in the housing, the pole piece having an outer diameter and an outer surface which extends into a close, noncontacting, spaced-apart relationship with the inner diameter and inner surface of the housing to define one or a plurality of small radial gaps between the inner surface of the housing and the outer surface of the first pole piece;

(e) ferrofluid retained in the radial gap or gaps by the magnetic flux of the permanent magnet to form one or a plurality of separate, spaced-apart, ferrofluid O-ring seals between the inner surface of the housing and the outer surface of the pole piece; and

(f) bearing means to provide support for the linear movement of the shaft element in the housing;

thereby providing a ferrofluid linear seal apparatus with hermetic sealing by ferrofluid O-ring seals in the radial gap during linear motion of the shaft element within the housing.

4,502,701

SEALING ASSEMBLY IN FLUID COUPLING

Howard A. Treloar, and Robert W. Gilbert, both of Adelaide, Australia, assignors to Mining Supplies (MINSUP) Pty. Ltd., Edwardstown, Australia

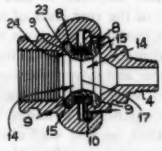
PCT No. PCT/AU82/00106, § 371 Date Mar. 25, 1983, § 102(e) Date Mar. 25, 1983, PCT Pub. No. WO83/00543, PCT Pub. Date Feb. 17, 1983
PCT Filed Jul. 7, 1982, Ser. No. 482,340
Claims priority, application Australia, Jul. 31, 1981, PF0020
Int. Cl.³ F16J *15/34*
U.S. Cl. 277—92 **11 Claims**

1. A fluid coupling comprised of two coupling members having hollow bodies interengageable the one with the other by means of lugs on each engaging shaped flanges on the other, and each having a sealing ring in an annular recess positioned to interengage the one with the other to sealingly place the hollow of one coupling member into communication with the hollow of the other coupling member, the improvement wherein each sealing ring comprises a compound sealing ring comprising

(a) a resilient sealing portion having a rear part which engages in the said recess in its coupling member and having an outwardly directed part extending to engage the out-

wardly directed part of the other resilient sealing portion, said outwardly directed part having a circumferential groove, and

(b) a rigid reinforcement portion on each said sealing ring encircling the outwardly directed part of each said resilient sealing portion, and engaged in the said groove to be



axially confined thereby, each said sealing ring slidably engaging in the outer part of the said recess of that coupling member and extending to have its outer face in at least close proximity to the outer face of the other said rigid reinforcement portion, whereby to resist outward displacement of the two interengaging portions of the said resilient sealing portions.

4,502,702

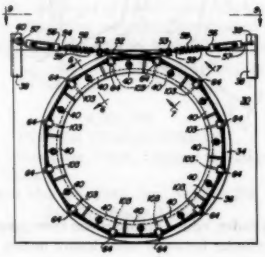
SEGMENTED SEAL FOR ROTARY EQUIPMENT

Robert J. Nixon, Jr., 2112 - 22nd St., Rock Island, Ill. 61201

Filed Jun. 8, 1984, Ser. No. 618,904

Int. Cl.³ F16J *15/24*

U.S. Cl. 277—101 **1 Claim**



1. A sealing assembly for effecting a seal between a stationary housing and a rotatable cylinder comprising:

a plurality of arcuate segments radially disposed about the outer circumference of the cylinder each having

an axial sealing surface defining a radius approximately equal to that of the rotatable cylinder; and

end sections for overlapping adjacent circumferentially disposed segments creating a gap and radial interface between said adjacent segments;

means for sealing the gaps formed by the adjacent overlapping segments;

means for tensioning the segments radially about the outside circumference of the cylinder; and

means for removably attaching each segment to said housing while concurrently permitting radial displacement of each segment independently from its adjacent segments.

4,502,703

HYDRAULIC POWER MANDREL

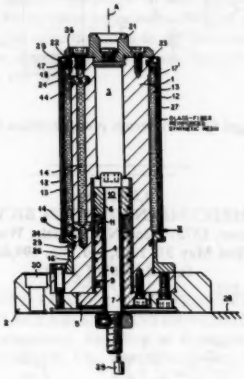
Günter H. Röhm, Heinrich-Röhm-Str. 50, 7297 Sontheim, Fed. Rep. of Germany

Filed Apr. 22, 1982, Ser. No. 370,957

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1981, 3116289

Int. Cl.³ B23B *31/40*

U.S. Cl. 279—2 A **9 Claims**



1. A power mandrel for a tubular workpiece, the mandrel comprising:

a mandrel body extending along, generally centered on, and adapted to be rotated about an axis;

a synthetic-resin tube generally centered on said axis, fittable within the tubular workpiece, having angularly extending reinforcement fibers, and having opposite ends formed with respective axially oppositely opening grooves each having one radially outwardly directed flank;

respective rings on said body axially flanking said tube and having axially projecting lips fitted to said grooves and each having one face engaging radially inward on the respective groove flank, said body, tube, and rings together forming a pressurizable compartment, one of said rings being axially slidable on said body and means on said body to limit movement of said ring;

respective adhesive bonds between each of said groove flanks and the respective lip face; and

means for pressurizing said compartment and thereby swelling said tube into direct surface engagement with the tubular workpiece it is within.

4,502,704

WORKHOLDING DEVICES

Joseph F. Jackson, Halifax, England, assignor to Pratt Burnerd International Limited, Halifax, England

Filed Oct. 19, 1982, Ser. No. 435,256

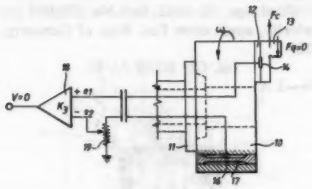
Claims priority, application United Kingdom, Oct. 29, 1981, 8132691

Int. Cl.³ B23B *31/28*

U.S. Cl. 279—111 **8 Claims**

1. A workholding device comprising a body, a plurality of relatively movable base jaws, a plurality of interchangeable top jaws, each top jaw being carried by an associated one of the base jaws, means for moving the base jaws relative to one another to grip a workpiece with the top jaws, a first sensing

device positioned to sense force transmitted from a top jaw to a base jaw, and a second sensing device being provided to



sense centrifugal force to permit compensation for its effect on the top jaws.

4,502,705

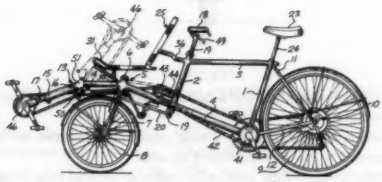
SEMIRECUMBENT TANDEM BICYCLE

James B. Weaver, 13737 - 2nd NE., Seattle, Wash. 98125

Filed May 31, 1983, Ser. No. 499,631

Int. Cl.³ B62M *3/00*

U.S. Cl. 280—231 **9 Claims**



1. In a bicycle for carrying a front rider and a rear rider, the improvement comprising the combination of:

a rear wheel;

a front wheel of substantially smaller diameter than said rear wheel;

a frame including rear fork means for carrying said rear wheel, front fork means for carrying said front wheel, a steering head above said front wheel and rotatably mounting said front fork means for steering control of the bicycle and post and crossbar means for connecting said rear fork means and said steering head;

a rear seat for the rear rider, carried by said frame adjacent to said rear wheel and having a generally horizontal seat portion;

a front seat for the front rider, carried by said frame, overlying said steering head and including a generally horizontal seat portion disposed at a height substantially lower than the height of said seat portion of said rear seat; and

drive train means for transferring power to said rear wheel and including a front pedal crank for the front rider, a rear pedal crank for the rear rider and means operatively connecting one of said wheels and said front and rear pedal cranks.

4,502,706

TRACTOR HITCH FRAME

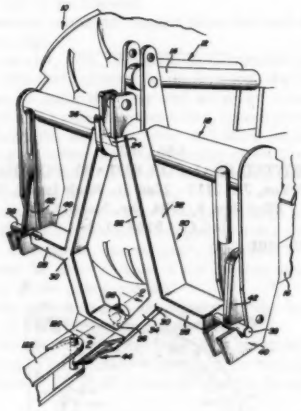
James E. Frambach, Sr., Rte. 1, Box 28, Emmetsburg, Iowa 50536

Filed Feb. 24, 1983, Ser. No. 469,396

Int. Cl.³ B60D *1/10*

U.S. Cl. 280—415 A **2 Claims**

1. A hitch assembly including a mounting portion having front and rear sides, a pair of front to rear extending jaws pivotally supported from said mounting portion for oscillation about laterally spaced axes, said jaws, forward of said axes defining coextensive notches opening forwardly and laterally toward each other, said levers, rearward of said axes, including registered generally semicircular recesses opening toward each other and adapted to embracingly engage one-half of the periphery of an associated hitch pin, said levers, intermediate said front and rear ends including means interconnecting said levers for substantially equal inverse oscillation, and a lock block shiftably supported from said mounting portion for movement into and out of a position received in said notches, said lock block, when disposed in said notches preventing swinging movement of the rear ends of said jaws away from each other and thus enabling said jaws to captively retain a hitch pin in said recesses, said mounting portion including vertically spaced upper and lower rearwardly projecting horizontal plates between which said jaws are pivotally mounted and a front-to-rear extending cylinder mounted therefrom forward of said notches, an end wall closing the rear end of said cylinder, front-to-rear extending elongated shank means sealingly and slidably received centrally through said end wall, said locking block being mounted on the rear end of said shank means, a piston slidably in said cylinder and mounted on the front end of said shank means, closure means closing the front



end of said cylinder, coiled compression spring means disposed within said cylinder between said closure means and said piston yieldingly biasing the latter rearwardly toward said end wall to thus rearwardly project said shank means and lock block toward a position with said lock block seated in said notches, abutment means in said cylinder supported from said closure means and projecting toward said piston within the confines of said spring, said abutment means limiting forward displacement of said piston in said cylinder and thus compression of said spring, and fluid pressure ingress and egress means opening into said cylinder closely forward of said end wall.

2. The hitch assembly of claim 1 including an upstanding generally hexagonal frame incorporating horizontally short upper and lower sides, a pair of oppositely horizontally outwardly projecting arms supported from said frame at the intersections between corresponding upper and lower sides of said frame, said upper side and said arms including means for support from the upper central arm of the lift hitch assembly and the lower opposite side lift arms of the lift hitch assembly, said mounting portion comprising said lower side of said frame.

4,502,707

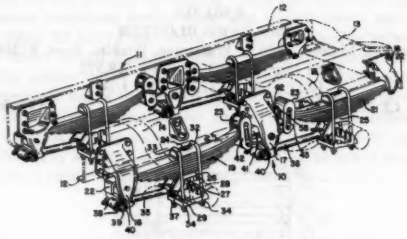
TANDEM AXLE SUSPENSION SYSTEM

Roger D. Jable, Downers Grove, and Alva R. Settle, Darien, both of Ill., assignors to Boler Investments, Inc., Itasca, Ill.

Filed Jun. 6, 1983, Ser. No. 501,512

Int. Cl.³ B60G *11/10*

U.S. Cl. 280—682 **11 Claims**



1. In a tandem axle suspension for a vehicle having first and second compound leaf springs mounted in tandem one behind the other on each side of the vehicle, an equalizer bar pivotally mounted on an equalizer support bracket secured to the frame of the vehicle between the adjacent ends of the first and second springs, first and second shackle assemblies pivotally attached between the ends of the equalizer bar and the adjacent ends of said first and second springs respectively, and front and read radius rods positioned beneath the related springs, each of the radius rods having a rear end connected to its related axle and having a front end connected to a part secured to the frame of the vehicle, said rear radius rod being located in the path of rotation of the equalizer bar so as to be subject to contact by the equalizer bar upon unrestrained rotation thereof the improvement which comprises:

an aperture formed in said second shackle and a hook formed on the second uppermost leaf of said second leaf spring for engaging said aperture and preventing vertical separating displacement of said second shackle relative to said second leaf spring whereby unrestrained rotation of said equalizer bar into contact with the rear radius rod is prevented.

4,502,708

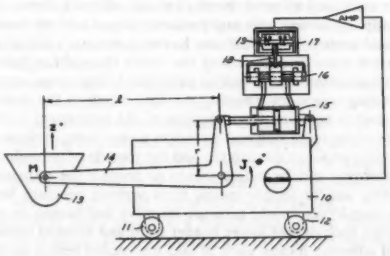
POWER TRANSMISSION

Lael B. Taplin, Union Lake, Mich., assignor to Vickers, Incorporated, Troy, Mich.

Filed Mar. 18, 1982, Ser. No. 359,288

Int. Cl.³ B62D *37/04*

U.S. Cl. 280—755 **15 Claims**



1. A stabilizing system for wheeled vehicles comprising

a wheeled upsprung vehicle,

a movable mass on the vehicle forming part of an implement and spaced longitudinally from a transverse axis of the vehicle,

an actuator mounted on the vehicle and connected to the mass for moving the mass,

electrical sensor means mounted on the vehicle for continuously sensing angular rate of pitching movement of the vehicle about said transverse axis about which angular movement is to be stabilized,

and electrical means responsive to said sensor means for controlling the actuator to cause movement of the movable mass in the same direction as the direction which the sensor means is sensing pitching movement of the vehicle and, in turn, the mass.

4,502,709

ARTICULATED LOADER WITH TRANSVERSELY DISPLACEABLE COUNTERWEIGHT

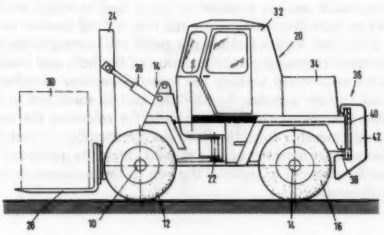
Hans Schaeff, Langenburg, Fed. Rep. of Germany, assignor to Karl Schaeff GmbH & Co., Langenburg, Fed. Rep. of Germany

Filed Mar. 24, 1982, Ser. No. 361,429

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1981, 3131512

Int. Cl.³ B66F *9/06*

U.S. Cl. 280—758 **14 Claims**



1. A pivoting vehicle, comprising:

(a) a forward carriage and a rear carriage including a rear end portion;

(b) hinge means defining a pivot axis connecting said forward and rear carriages to permit pivoting excursions of at least one of said carriages about said axis;

(c) pivot control means associated with said forward and rear carriages for pivoting excursions of at least one of said carriages;

(d) work means mounted to said forward carriage;

(e) guide means mounted to said rear end portion and extending transversely thereof;

(f) counterweight means mounted to said guide means and adapted for lateral displacement along said guide means; and,

(g) control means associated with said counterweight means and said forward carriage for cooperative lateral displacement of said counterweight means by pivoting of at least one of said forward and rear carriages whereby proportional displacement of said counterweight means is associated with each pivoting excursion of at least one of said forward and rear carriages and in a direction opposite thereto.

4,502,710

LOCKABLE MOVING BELT ANCHOR FOR PASSIVE VEHICLE OCCUPANT RESTRAINT BELT SYSTEMS

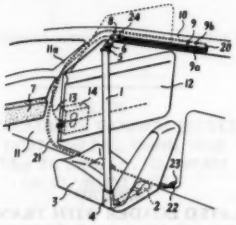
Juichiro Takada, Tokyo, Japan, assignor to Takata Kogyo Co., Ltd., Tokyo, Japan

Filed May 31, 1979, Ser. No. 44,196

Claims priority, application Japan, Jun. 8, 1978, 53-077236; Jun. 8, 1978, 53-068348; Jun. 9, 1978, 53-068758; Jun. 15, 1978, 53-081113; Jun. 29, 1978, 53-078097; Feb. 21, 1979, 54-018500; Feb. 28, 1979, 54-021883; Feb. 28, 1979, 54-024068; Mar. 8, 1979, 53-030229; Mar. 26, 1979, 54-034247

Int. Cl.³ B60R *21/10*

U.S. Cl. 280—804 64 Claims



1. In a passive vehicle occupant restraint belt system having a restraint belt which can be shifted between an occupant-restraining configuration and an occupant-releasing configuration by movement of a portion thereof along a path defined by a guide rail affixed in the vehicle, the improvement comprising a movable anchor member received for movement along the rail and adapted to receive said belt portion, a cable-driven anchor transfer element coupled by a lost motion connection to the movable anchor member to move said movable anchor member in both directions along the rail, a fixed anchor member at a restraint location along the guide rail corresponding to the occupant-restraining configuration of the belt, and locking means for selectively locking the movable anchor member to the fixed anchor member so that the belt is anchored in the occupant-restraining configuration and for releasing the movable anchor member from the fixed anchor member so that said movable anchor member can be moved along the guide rail by the transfer element to transfer the belt to the occupant-releasing configuration.

4,502,711

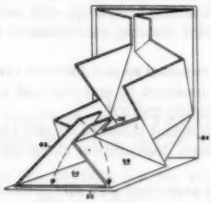
SHEET FOLDING METHOD AND PRODUCT

Stephan R. W. Muth, 201 Varick St., New York, N.Y. 10014

Filed Jul. 6, 1983, Ser. No. 511,189

Int. Cl.³ B42D *19/00*; G09B *29/00*; B31F *1/00*

U.S. Cl. 281—5 6 Claims



1. An improved sheet folding method comprises forming central cross folds through the center of the sheet, and upper and lower lateral folds, which define rectangular outer panels with V-shaped ends tapering to the center of the sheet, forming central vertical reverse folds and a pair of vertical side folds spaced from the central vertical fold, which define an inner pleat and, in conjunction with said cross folds, a pair of outer pleats with opposing sides, and forming, at the ends of one side of each of the outer pleats, a lateral reverse fold and a vertical fold, which define, in conjunction with said cross folds, a pair of tuck folds which fold under the opposing sides of the outer pleats when the sheet is in a folded condition.

4,502,712

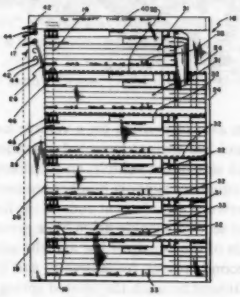
TIME CARD BLOTTER

Harold H. Malone, 3900 E. Waterman, Wichita, Kans. 67218

Filed Mar. 9, 1983, Ser. No. 458,575

Int. Cl.³ B41L *1/20, 1/74, 3/00*

U.S. Cl. 282—22 A 13 Claims



1. A time card blotter comprising in combination recording and/or ledger means having a plurality of superimposed combined border stubs and record leaves arranged in pairs with all pairs stacked in an overlying relationship as pages in a book and with each having a lower permanent record portion; a top cover leaf; a bottom cover leaf; a binding means binding together the top cover leaf, the combined border stubs and record leaves, the recording and/or ledger means, and the bottom cover leaf, adhesive means for interconnecting the border stubs and record leaves in a predetermined order and at certain locations; each pair of combined border stubs and record leaves including a top border stub, a lower border stub, a top record leaf, and said lower permanent record portion which is a lower record pressure sensitive leaf; said top border stub of each pair having a perforate line longitudinally traversing the structure of the top border stub; said top cover leaf having a structure defining a weakened score line traversing the width thereof for folding the top cover leaf in half and pivoting the same around the binding means for storing the permanent record portion of the recording and/or ledger means in the top cover leaf between the folded portions thereof, said top record leaf of each pair having an end overlying each of said top border stubs and secured thereto by said adhesive means and generally registering with said perforate line of said top border stub; said bottom cover leaf also having a structure defining a weakened score line traversing the width thereof for folding the bottom cover leaf in half to pivot the folded same around the binding means for inserting the folded half of the bottom cover leaf in between the underside of the permanent record portion of the recording and/or ledger means being written on by writing pressure thereabove and the topside of an underlying recording and/or ledger means to protect the remaining recording and/or ledger means from writing pressure from above; said lower record pressure sensitive leaf having an end overlying each of said lower border stubs and secured thereto by said adhesive means; each of said top record leaves having printed matter for record keeping extending transversely across said top record leaves, said printed matter being repeated at equally spaced intervals a plurality of times from the upper to the lower portion of said top record leaves; parallel

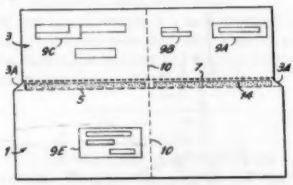
rows of perforations extending transversely across the entire width of said top record leaf contiguous to the upper extremities of each of said equally spaced repetitive printed matter; said top cover leaf being pivoted around the binding means and over the superimposed combined border stubs and record leaves and for storing the lower record pressure sensitive leaves in the top cover leaf between the folded portions thereof after the top record leaf is torn off; said bottom cover leaf being pivoted around the binding means and under the superimposed combined border stubs and record leaves and for inserting the folded half of the bottom cover leaf in between the lower record pressure sensitive leaf of said record leaves being written on by writing pressure on the top record leaf thereabove and a top record leaf of an underlying pair of record leaves to protect the underlying pressure sensitive leaves from writing pressure from above; said adhesive means additionally securing the top border stub to the lower record pressure sensitive leaf along an edge thereof.

4,502,713

POSTAL FORMS

Romano Conti, Via P. della Francesca, 37-Prato(Firenze), Italy

Filed Feb. 28, 1983, Ser. No. 470,324
Claims priority, application Italy, Mar. 9, 1982, 11575/82[U]
Int. Cl.³ B42D *15/00*; B41L *1/20, 1/22*
U.S. Cl. 283—1 B **8 Claims**



1. A form having a front surface adapted to be printed on and a rear surface;

said form being defined by a first rectangular region having two parallel longitudinal edges and two transverse short edges joining the ends of said longitudinal edges, a second rectangular region having parallel longitudinal edges and short transverse edges joining the ends of said longitudinal edges, and an intermediate region joining adjacent longitudinal edges of said first and second regions, the transverse and longitudinal dimensions of said second region being smaller than those of said first region;

a first creasing line defined along the longitudinal edge of said first region adjacent the intermediate region;

a second creasing line extending across said first and second regions intermediate and parallel to said short transverse edges thereof;

first and second pre-glued sticking strips adapted to adhere together under pressure on the rear surface of the form adjacent said short transverse edges of said first region, said first and second sticking strips leaving an area of the rear surface of said first region having a longitudinal dimension equal to or greater than the longitudinal dimension of said second region free of pre-gluing;

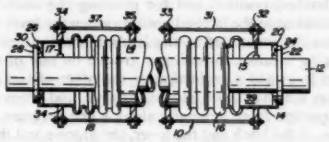
said form being placed in a folded state by first folding said form along said first creasing line to bring the rear surfaces of said first and second regions face to face, and then folding the form along said second creasing line so as to bring said pre-glued sticking strips into contact with one another to hold said form in said folded state.

4,502,714

VACUUM SPOOL PIECE AND JOINT

Richard A. Brown, Gahanna, and Richard K. Wilson, Sunbury, both of Ohio, assignors to CVI Incorporated, Columbus, Ohio

Filed Sep. 29, 1982, Ser. No. 426,407
Int. Cl.³ F16L *59/14*
U.S. Cl. 285—47 **7 Claims**



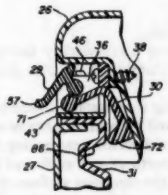
1. A spool piece adapted to be connected end to end with a like spool piece at a joint comprising an inner conduit surrounded by and spaced from an outer jacket which is shorter than said inner conduit, each end of said inner conduit projecting beyond the adjacent end of said jacket, said outer jacket including an expansion-contraction portion adjacent each end thereof, each end portion of said jacket having a first member in sealing contact with a mating second member, said second member being mounted on said inner conduit, and one of said first and second members being movable to interrupt the seal between said mating members.

4,502,715

LATCH ASSEMBLY

Gene D. Lundblade, Valley Center, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.

Filed Sep. 29, 1982, Ser. No. 427,949
Int. Cl.³ E05C *19/02*
U.S. Cl. 292—78 **11 Claims**



1. A latch assembly for a closure comprising:

a latch pivotally mounted on the closure for pivoting movement about a first axis between latched and unlatched positions,

a lever pivotally mounted on the closure for pivoting movement about a second axis which is parallel to said first axis between latched and unlatched positions,

interengaging means on the latch and on the lever for pivoting the latch from the latched position to the unlatched position when the lever is pivoted from the latched to the unlatched position and for pivoting the latch from the unlatched to the latched position when the lever is pivoted from the unlatched to the latched position, and

a mounting bracket attached to said closure, said mounting bracket having a pair of parallel side portions and a pair of openings in each of the side portions, said latch being pivotally mounted in said bracket by a pair of pins which extend through one of the openings in each of the side portions of said bracket and into said latch, said lever being pivotally mounted in said bracket by a pair of pins which extend through the other opening in each of the side portions of said bracket and into said lever.

5. A latch assembly for a closure comprising:

a latch pivotally mounted on the closure for pivoting move-

ment about a first axis between latched and unlatched positions,

a lever pivotally mounted on the closure for pivoting movement about a second axis which is parallel to said first axis between latched and unlatched positions, and

interengaging means on the latch and on the lever for pivoting the latch from the latched position to the unlatched position when the lever is pivoted from the latched to the unlatched position and for pivoting the latch from the unlatched to the latched position when the lever is pivoted from the unlatched to the latched position, said interengaging means comprising a groove on one of said latch and lever and a projection on the other of said latch and lever which extends into said groove, said groove and said projection lying generally along a line between the pivot axes of the latch and the lever, the groove and the projection moving from one side of said line to the other when the latch and the lever move between their latched and unlatched positions.

4,502,716

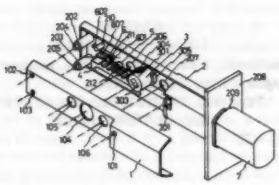
TWO-SHIFT LOCK-TONGUE DRIVE UNIT

Tseng-Tsai Yu, 2-6th Fl., 13, Lane 118, Chung Ching S. Rd., Sec. 1, Taipei, Taiwan

Filed Jul. 14, 1982, Ser. No. 398,043

Int. Cl.³ E05C *1/04*

U.S. Cl. 292—142 **4 Claims**



1. A lock comprising:

a lock tongue having a rearwardly facing elongated rack with teeth and a plurality of notches disposed at intervals along said rack;

a rocking arm having a camming surface and a lug which is sized to be received by said notches in said rack;

a rotationally mounted sector gear having teeth arranged to engage with the teeth of said rack and having a cam arranged to engage the camming surface of said rocking arm and to thereby move said lug of said rocking arm into one of said notches, said sector gear in one rotational position thereof driving said lock tongue and in another rotational position thereof locking said lock tongue in place by means of said cam and camming surface causing said lug to engage one of said notches.

4,502,717

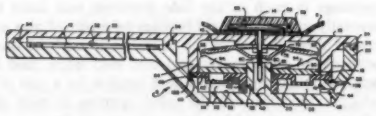
PNEUMATICALLY RELEASABLE, TAMPER-RESISTANT SECURITY TAG

Leo R. Close, Sepulveda, Calif., assignor to Mrs. Lawrence Israel, Van Nuys, Calif.

Filed Jun. 7, 1983, Ser. No. 501,881

Int. Cl.³ B65D *33/34*

U.S. Cl. 292—316 **10 Claims**



1. A reusable security tag adapted to carry a detectable transponder element and to be attached to an article such as a garment, including:

a housing having a tack-receiving opening and defining a chamber, the chamber having an air inlet;

a tack having a head and a pointed shank adapted to pass through the article and into the housing through the tack-receiving opening;

a one-way latch spring fastener enclosed within and concealed by the housing, the fastener being adapted to receive and grip the shank of the tack, portions of the fastener being displaceable to effect release of the tack; and

means, interposed between the chamber and the latch spring fastener and operatively associated with the displaceable portions of the fastener, movable in a direction generally parallel with the tack shank for effecting release of the tack, air under pressure admitted into the chamber through the inlet acting on said release-effecting means to move said displaceable portions of the fastener to release the tack.

4,502,718

AUTOMATIC DOOR LOCKING/UNLOCKING DEVICE FOR AN AUTOMOTIVE VEHICLE

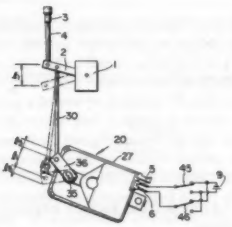
Ichiro Sasaki, Yokohama; Yujiro Tsutsui; Masaru Inoue, both of Kamakura, and Toru Kase, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited and Jidosha Denki Kogyo Kabushiki Kaisha, both of Yokohama, Japan

Filed Apr. 1, 1982, Ser. No. 364,234

Claims priority, application Japan, Apr. 15, 1981, 56-56529

Int. Cl.³ E05C *3/06*

U.S. Cl. 292—336.3 **15 Claims**



1. A door lock/unlock system for an automotive vehicle comprising:

a mechanically operable door lock mechanism operable between a door lock position and a door unlock position;

an electrically operable actuator including:

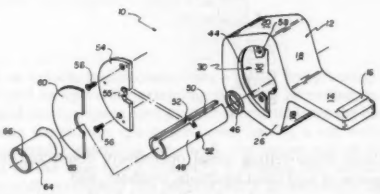
an electrical driving means mechanically connected to said door lock mechanism for operating said door lock mechanism between said door lock and unlock positions; and

a first switch including a movable switch member coupled to said driving means for movement according to a driving operation of said driving movement either in a door locking direction or in a door unlocking direction, and having a first and second position settable respectively corresponding to the door unlock and lock positions of the door lock mechanism; and

a driving circuit connecting said driving means to an electric power source, said circuit having a second switch switchable between a first position in which said driving means is driven for operating said door lock mechanism in said door locking direction and a second position in which said driving means is driven for operating said door lock mechanism in said door unlocking direction, said second switch associated with said first switch for establishing electrical communication between said power source and said driving means during one of at least two switch conditions in which said first switch is in said first position and said second switch is in said first position, and said first switch is in said second position, and said second switch is in said

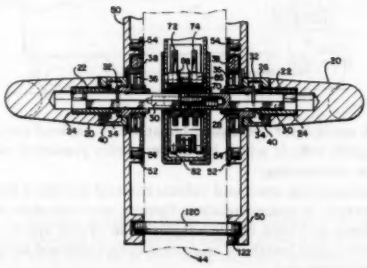
second position, and for blocking electrical communication between said power source and said driving means during switch conditions in which said first switch is in said first position and said second switch is in said second position or said first switch is in said second position and said second switch is in said first position.

4,502,719
LEVER DOOR HANDLE
Eugene H. Perry, 239 Irving, San Francisco, Calif. 94122
Filed Apr. 6, 1983, Ser. No. 482,505
Int. Cl.³ E05C *13/00*
U.S. Cl. 292—347 **19 Claims**



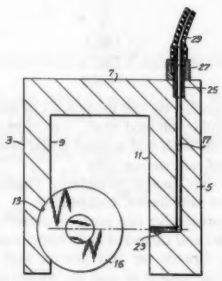
1. A door handle comprising in combination:
a handle means provided with means to receive a stem from a conventional door latch mechanism,
and counter balancing means integrally formed on said handle means to offset any rotational effect of said handle means which occurs when said handle means is rotated to latch or unlatch an associated door,
wherein said handle means is a cast structure having a hollowed out interior provided with a metal housing therewithin, said metal housing and interior hollow offset from a geometrical center of said handle.

4,502,720
DOOR LATCH APPARATUS
Peter Fayerman, Douglassville, and Elwood Shaffer, Reading, all of Pa., assignors to Baldwin Hardware Manufacturing Corporation, Reading, Pa.
Filed Jun. 4, 1982, Ser. No. 385,325
Int. Cl.³ E05B *3/00, 15/02*
U.S. Cl. 292—348 **8 Claims**



1. A latch mechanism for a door, having concealed and protected mounting means, comprising:
a rotatable spindle shaft disposed in the door and extending beyond opposite surfaces of the door, rotation of the spindle shaft causing operation of the latch mechanism, the shaft having handles rigidly mounted on the ends thereof, at least one of the handles having a separate bushing mounted in a bore in the handle and extending therefrom to form a handle extension, the extension having an annular groove spaced from the handle;
first and second trim plates mounted on opposite surfaces of the door, the spindle shaft passing through openings in said first and second trim plates;
at least one post rigidly attaching the first and second trim plates to one another through the door, the post being endwise attached to a rear portion of both the first and second trim plates facing inwardly toward the door, exposed, outwardly-facing surfaces of the trim plates protecting the post from access;
a trim bushing removably connected to at least one of said trim plates, the trim bushing having a central bore, the handle extension extending through the bore in the trim bushing; and,
a retaining ring fit in the annular groove of the handle extension, the retaining ring in the groove being dimensioned larger than the bore in the trim bushing, whereby said handle and spindle shaft are locked against movement along an axis defined by the spindle shaft, due to interaction of the retaining ring and the trim bushing.

4,502,721
GRIPPING DEVICE
Andrei Savin-Czeizler, Forest Hills, N.Y., and Kenneth Lang, Gillette, N.J., assignors to Bristol-Myers Company, New York, N.Y.
Filed Jan. 30, 1984, Ser. No. 575,098
Int. Cl.³ B66C *1/02*
U.S. Cl. 294—1.1 **5 Claims**



1. A gripping device for handling objects comprising first and second leg members spaced apart from each other, each of said leg members being provided with an inner surface that faces an inner surface of its opposite member;
(a) said first leg member being provided with a cutout portion in its inner face which follows the approximate shape of the object to be gripped;
(b) said second leg member being provided on its inner surface with means for delivering a jet of a gas toward said cutout located in the inner surface of said opposite leg;
whereby an object to be gripped may be positioned in said cutout of said first leg member and kept in said position by means of a jet of gas that is directed against it from said gas jet delivery means located on said second leg member.

4,502,722
DEBRIS PICKER WITH INTERCHANGEABLE TIPS
Camille J. Rocquin, 1410 Demosthenes St., Metairie, La. 70005
Filed May 23, 1983, Ser. No. 497,367
Int. Cl.³ B01B *1/00*
U.S. Cl. 294—61 **6 Claims**

1. An apparatus with interchangeable tips for picking up debris, which comprises:
a. a hollow tubular shaft having upper and lower ends;
b. handle means attached to the upper end of said shaft;
c. receiving means mounted on the lower end of said shaft for receiving in frictional engagement one of said interchangeable tips, wherein said receiving means further comprises:
i. a receptacle having a tapered cylindrical bore;

ii. a slot in the side wall of said receptacle which extends into said bore, and;

iii. means when insertable into said slot makes contact with the upper end of said tip forcing said tip out of engagement with said receptacle, disengaging said tip from said receptacle;

d. a sleeve slideably mounted on said shaft, slidable from a first upper position exposing said tip to a second lower position covering over said tip;

e. a first collar, mounted on the lower end of said sleeve, to force removal of debris collected on said tip when said sleeve is moved to said second position;

f. means for limiting the distance that said sleeve may slide down said shaft, which comprises:

i. a second collar, on the inner wall of said sleeve; and

ii. a third collar, on said shaft, which moves to stopping engagement with said second collar limiting the sliding distance of said sleeve; and

g. protective cap means threadably engageable onto the lower end of said sleeve, comprising:

i. a hollow protective cap portion, closed at its lower end and opened and threaded at its upper end for threadably engaging threads on said sleeve, said protective cap allowing movement of said tip within said cap yet precluding exposure of said tip outside of said cap; and

ii. a rubber tip portion engageable on the outside of said closed end of said cap.

4,502,723

OIL HYDRAULIC CIRCUIT FOR GRIPPING DEVICE

Kazunori Kuromoto, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jun. 23, 1983, Ser. No. 507,095

Claims priority, application Japan, Jun. 30, 1982, 57-097250[U]

Int. Cl.³ B66C *3/16*; F15B *13/042*

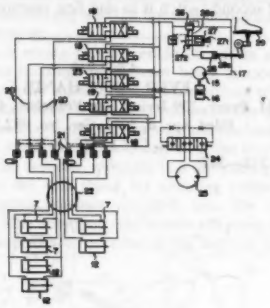
U.S. Cl. 294—88 **2 Claims**

1. In a gripping device including mounting means, a plurality of articulate gripping fingers coupled to said mounting means, each gripping finger having a first segment pivotally coupled to said mounting means and a second segment pivotally coupled to said first segment, a plurality of first hydraulic cylinders each for operating said respective first segments and a plurality of second hydraulic cylinders each for operating said respective second segments, a hydraulic circuit for the gripping device comprising:

a hydraulic pump;

pilot-operated relief valve means disposed in a conduit connecting said hydraulic pump with said first and second hydraulic cylinders, said relief valve means having a pilot pressure conduit connected thereto and a relief pressure thereof being variable according to a pilot pressure in the pilot pressure conduit;

a third hydraulic cylinder for providing a variable pilot pressure to said pilot-operated relief valve means, said third hydraulic cylinder being connected to the pilot pressure conduit and having slidably mounted therein a piston;



a clamp force setting pedal operatively connected to the piston of said third hydraulic cylinder; and

a directional control valve disposed in the pilot pressure conduit for selectively supplying a variable pilot pressure to said pilot-operated relief valve means.

4,502,724

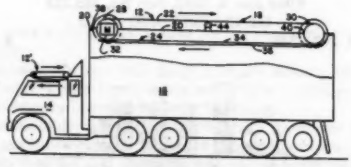
VEHICLE PAYLOAD LIGHTENER

R. Miles Grenadier, Box 731, Lenox, Mass. 01240

Filed Oct. 16, 1980, Ser. No. 197,508

Int. Cl.³ B62D *35/00*

U.S. Cl. 296—1 S **15 Claims**



1. A method for decreasing the apparent payload carried by a transport vehicle which has an outwardly presented external portion, comprising:

superimposing upon said vehicle external portion a movable surface in spaced relation thereto, said movable surface being provided as the external side of the upper run of substantial length, of an endless band entrained about two cylinders; and

while said vehicle is advancing along a path, moving said surface rearwardly at a substantially greater velocity than said vehicle is advancing forwardly, while maintaining said superimposition;

sensing the speed at which said vehicle is advancing along said path, and

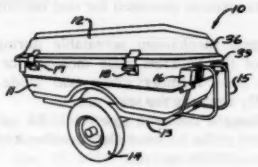
at least up to a preselected maximum, automatically, moving said movable surface in proportion to said sensed speed of vehicle advance according to a manaully variable ratio having a preselected maximum.

4,502,725

SEAL STRUCTURE FOR STORAGE CONTAINER

Morris N. Wiant, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.

Filed Apr. 5, 1982, Ser. No. 365,631
Int. Cl.³ B65D 43/10; B60R 5/00
U.S. Cl. 296—181 12 Claims



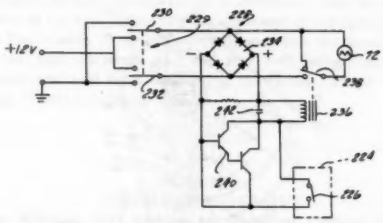
1. A vehicle trailer comprising a trailer body having a bottom and an upwardly extending side wall providing an open-topped storage space, and a cover supportable by the body for closing the storage space, the cover having a top wall and a downwardly extending side wall, the upper end of the side wall of the base being generally U-shaped and including an outwardly extending rim portion and a downwardly and outwardly extending flange portion, the side wall of the cover including a generally outwardly extending shoulder portion which is engageable with the rim portion of the side wall of the base whereby the cover is supported by the base and a downwardly and outwardly extending flange portion which is engaged by the flange portion of the side wall of the base when the shoulder is supported by the rim to provide a seal between the cover and the base, at least one of the flange portions of the base side wall and the cover side wall being flexible whereby the flexible flange portion can flex as the flange portions engage each other.

4,502,726

CONTROL APPARATUS FOR PIVOTAL-SLIDING ROOF PANEL ASSEMBLY

Allan J. Adams, Lincoln Park, Mich., assignor to ASC Incorporated, Southgate, Mich.

Filed Sep. 27, 1982, Ser. No. 424,071
Int. Cl.³ B60J 7/04; H01H 47/02
U.S. Cl. 296—221 6 Claims



1. A control apparatus for a pivotal/sliding roof panel assembly powered by a reversible electric drive motor for movement of roof panel from a closed position to either of a vent or open position in an opening formed in the roof of a vehicle comprising:

a first, manually operable switch means adapted to be connected to a source of electrical power and to connect electrical power in first and second opposite polarities to the drive motor;

sensor means for sensing when the roof panel is in the closed position in the roof opening, the sensor means having an output switchable between two distinct states when the roof panel reaches the closed position;

means, responsive to the sensor means, for disconnecting the drive motor from the source of electrical power when the roof panel reaches the closed position from either of the vent or open positions, the disconnecting means including:

first control means, responsive to the first switch means and the sensor means output, for providing an output which is switchable between a first state corresponding to the roof panel being in a closed position and a second state corresponding to the roof panel being away from the closed position, the first control means output being disposed to disconnect the drive motor from the source of electrical power when the roof panel reaches the closed position; and

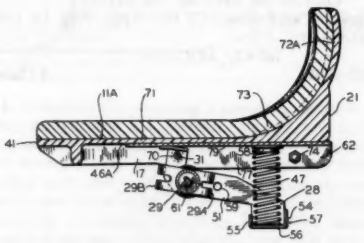
means, responsive to the sequential de-activation and re-activation of the first switch means, for momentarily bypassing the first control means when the first control means is in the first roof panel closed state and connecting the drive motor to the source of electrical power to move the roof panel from the closed position to either of the vent or open positions until the roof panel has moved from the closed position to switch the first control means to the second state.

4,502,727

PIVOT MOUNTED CYCLE SEAT WITH SPRING CRADLE

Stephen A. Holcomb, 3945 Cherry Hill Rd., Knollwood Village, Santa Maria, Calif. 53455, and Johnny E. Aker, 1480 Adelia Ave., South El Monte, Calif. 91733, assignors to Stephen A. Holcomb, Santa Maria, Calif.

Filed Jul. 12, 1982, Ser. No. 397,608
Int. Cl.³ B62J 1/00
U.S. Cl. 297—209 4 Claims

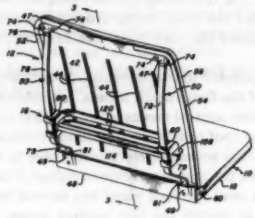


1. In a cycle seat for conventional cycles with upwardly protruding seat attachment posts and conventional seat post clamps having a securing bolt the combination comprising a seat base, a seat back rising from the seat base, transversely spaced, parallel rails depending from the bottom of the seat base, each rail having fore and aft portions and each rail further having transverse walls defining apertures through the rail at longitudinally spaced intervals along the rails both fore and aft on the rail; a transverse pivot bolt lodged in transverse apertures of the parallel rails in the fore portion thereof, a central compression spring freely bearing against the seat base aft of the pivot bolt, a spring cradle secured in a fixed position with respect to the seat post by said seat post clamp, forward stops on the cradle adapted to register against the bottom of the seat base, a central aft spring cradle cup adapted to freely receive the lower end of the compression spring, said seat base having a perimeter transversely broader aft than forward.

4,502,728
PORTABLE SEAT AND BACK REST

Samuel B. Sheldon, Marblehead; Jack L. Leach, Natick, and Scott A. Harkness, Jamaica Plain, all of Mass., assignors to Nepsco, Inc., Holliston, Mass.

Filed Oct. 8, 1982, Ser. No. 433,415
Int. Cl.³ A47C 7/46
U.S. Cl. 297—284 14 Claims

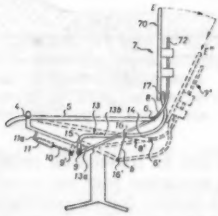


1. A portable seat and back rest assembly comprising
a pair of spring-like plates hinged together to form a seat rest frame and a back rest frame,
a soft foam cover on the top surface of the seat plate and on the front surface of the back rest plate,
a pair of parallel tracks mounted on the back of the back rest plate, one adjacent each side edge of the plate,
an adjusting slide mounted on the tracks and bearing against the back of the back rest plate and imparting a forward transverse bow in the back rest plate to provide a lumbar support,
and friction means forming part of the slide and engaging the tracks to yieldably retain the slide at any selected vertical elevation on the tracks.

4,502,729
CHAIR, ESPECIALLY A RECLINING CHAIR

Hermann Locher, Dornach, Switzerland, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland

Filed Jul. 26, 1982, Ser. No. 401,617
Claims priority, application PCT Int'l Appl., Aug. 19, 1981, PCT/CH81/00094
Int. Cl.³ A47C 3/00
U.S. Cl. 297—301 8 Claims

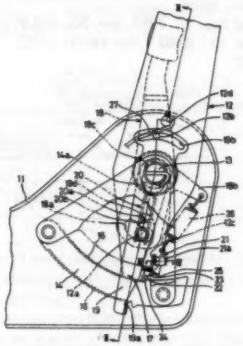


1. A reclining chair comprising:
a seat having a rear edge;
a backrest cooperating with the rear edge of the seat;
rigid seat support means including means defining a stationary pivot axis about which the seat can be pivoted rearwardly into a reclining position;
said backrest moving downwardly along with the rear edge of the seat during the reclining of said seat;
means defining a movable pivot axis for the backrest and which movable pivot axis is mounted at the seat;
said backrest being simultaneously pivotable about the movable pivot axis mounted at the seat;
a reclining mechanism provided for said backrest and inclining a guide element and a spring arrangement, with said guide element cooperating with said spring arrangement and with said means defining said movable pivot axis;
said reclining mechanism ensuring that the backrest moves through a larger pivot angle than the pivot angle of the seat during pivoting of the backrest;
said backrest containing a backrest plate member capable of pivotal motion;
a guide arrangement provided for said backrest plate member;
an adjustment mechanism actuatable during the pivotal motion of the backrest plate member for drawing the backrest plate member along said guide arrangement downardly towards the seat;
means defining a common pivot axis for said adjustment mechanism of the backrest plate member and the reclining mechanism of the backrest;
said rigid seat support means further including means defining a fixed pivot axis situated in fixed spaced relationship to said stationary pivot axis and about which there is pivotable said common pivot axis;
said adjustmet mechanism comprising a transmission lever pair;
said transmission lever pair interconnecting said common pivot axis and said fixed pivot axis and being rotatable about said fixed pivot axis;
said transmission lever pair extending past said fixed pivot axis; and
said transmission lever pair during the movement of the common pivot axis initiating a movement of the backrest plate member which is greater in comparison thereto.

4,502,730
FIXED-ANGLE ADJUSTING MECHANISM

Kenichi Kazaoka, Nagoya, and Hiroshi Okazaki, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed May 25, 1983, Ser. No. 497,874
Claims priority, application Japan, Jun. 8, 1982, 57-099018
Int. Cl.³ A47C 1/025
U.S. Cl. 297—366 6 Claims



1. A fixed-angle adjusting mechanism comprising:
(a) a fixed member having a latch member;
(b) a movable member angularly movably mounted on said fixed member and having a pawl member engageable with said latch member in a desired angular position;
(c) a control lever angularly movably mounted on said fixed member and actuatable for disengaging said pawl member from said latch member;
(d) a memory member engageable with said latch member in response to actuation of said control lever;
(e) a limiting member angularly movably mounted on said

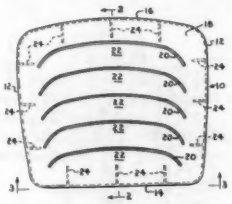
fixed member, and engageable with said pawl member for preventing the latter from engaging said latch member in response to actuation of said control lever and responsive to coaction with said memory member for disengaging from said pawl member; and

(f) means acting on said memory member for positioning the latter in an angular position corresponding to said desired angular position.

4,502,731
SEAT FRAME

Robert A. Snider, 9832 N. Range Line Rd., Mequon, Wis. 53092

Continuation of Ser. No. 269,123, Jun. 1, 1981,. This application Jun. 25, 1984, Ser. No. 623,974
Int. Cl.[3] A47C *7/02*
U.S. Cl. 297—452 **4 Claims**



1. A one-piece seat frame for an upholstered seat, comprising a relatively rigid, resilient, thin-walled hollow, molded plastic body having a pair of parallel side walls, a rear wall perpendicular to said side walls, a front wall perpendicular to said side walls, and a top for support of a one-piece, molded foam rubber or other similar seat cushion which fits over and around said top, said side walls, said rear wall and said front wall, said top having a plurality of parallel curvilinear slots which demarcate a plurality of parallel curvilinear spring segments positioned perpendicular to said side walls, and said top being sloped upward from said side walls to create a positive bow for each of said spring segments such that each of said spring segments deflects downward in a cantilever manner in response to the load created by the occupant of the upholstered seat but returns to its bowed position when the load is removed, said side walls and said rear wall being essentially straight and said front wall being outwardly curved in the shape of said curvilinear slots.

4,502,732
CHILD CAR RESTRAINT

Glen Williams, 5221 Saranac St., Montreal, Quebec, Canada H3W 2G5

Filed Sep. 27, 1982, Ser. No. 424,237
Int. Cl.[3] A63B *35/00*; B60R *21/02*
U.S. Cl. 297—488 **10 Claims**

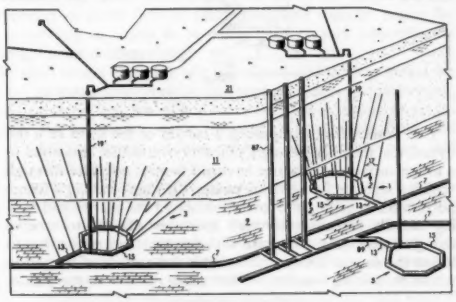
1. A device for use with a vehicle seat lap belt to restrain a sitting child in a vehicle seat; the device having a first curved shell area for at least partially wrapping about the lap of a sitting child; the first shell area having an inner edge, an outer edge and side edges; a second curved shell area for at least partially wrapping about the torso of a sitting child; the second shell area having an inner edge, an outer edge and side edges; the first and second shell areas joined together by their inner edges with their convex surfaces facing each other; and brace means extending between the two shell areas for preventing their outer edges from moving any great distance toward each other, said movement preventing brace means located midway between the side edges of both shell areas and extending from

about the outer edge of the first shell area to about the outer edge of the second shell area.

4,502,733
OIL MINING CONFIGURATION

James R. Grubb, Golden, Colo., assignor to Tetra Systems, Inc., Golden, Colo.

Filed Jun. 8, 1983, Ser. No. 502,089
Int. Cl.[3] E21C *41/00*
U.S. Cl. 299—2 **65 Claims**



1. A method for operating a tunneling machine to form a mine configuration in a subsurface stratum, said configuration substantially resembling a lollipop when viewed from above and having a stem portion and a substantially annular head portion with said configuration being primarily intended for use as a production drift for the recovery of petroleum from an overlying, oil bearing formation by gravity drainage, said tunneling machine having front and rear ends with said front end having excavating means thereon and said tunneling machine moving in a forward direction when said front end leads said rear end and in a rearward direction when rear end leads said front end, said method including the steps of:

(a) advancing said tunneling machine in said subsurface stratum from a first location to a second location in said forward direction with said excavating means operating to form the stem portion of said lollipop,

(b) advancing said tunneling machine in said forward direction from said second location substantially in a first radial direction about a vertical axis spaced from said second location to a third location with said excavating means operating to form a part of the annular head portion of said lollipop,

(c) moving said tunneling machine in said rearward direction from said third location back to said second location along said part,

(d) advancing said tunneling machine in said forward direction from said second location substantially about said

vertical axis in a second radial direction substantially opposite to said first radial direction to said third location with said excavating means operating to form the remaining part of the annular head portion of said lollipop,

(e) advancing said tunneling machine in said forward direction from said third location in said second radial direction to said second location, and

(f) advancing said tunneling machine in said forward direction from said second location along said stem portion to said first location wherein a lollipop-shaped production drift is formed by said tunneling machine.

4,502,734

SCABBLER BITS

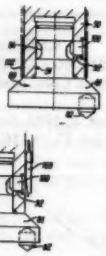
David T. Allan, 9 Broomhill Dr., Glasgow, Scotland

Filed Jun. 23, 1982, Ser. No. 391,585

Claims priority, application United Kingdom, Jun. 25, 1981, 8119658

Int. Cl.³ E21B *10/00*

U.S. Cl. 299—88 **7 Claims**



1. A scabbler bit comprising a carrier in the form of a flat cylindrical member having a plurality of scabbler tips fitted to a lower surface, the carrier having a central aperture through which a separate fixing shank passes, the shank having a flange portion for engaging the lower surface of the carrier and having radially extending through apertures adapted to receive fixing means which cooperate with apertures in a piston thus to locate the carrier firmly against the lower surface of the piston whilst permitting rotation of the carrier relative to the piston.

4,502,735

DECELERATION-SENSITIVE TYPE HYDRAULIC BRAKE PRESSURE CONTROL VALVE FOR AUTOMOTIVE VEHICLE

Hitoshi Kubota, Minami-ashigara, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Jun. 1, 1983, Ser. No. 499,849

Claims priority, application Japan, Jun. 3, 1982, 57-94029; Jun. 3, 1982, 57-94030

Int. Cl.³ B60T *8/14*

U.S. Cl. 303—24 F **11 Claims**

1. A deceleration-sensitive type hydraulic brake pressure control valve for an automotive vehicle for restrictively controlling the hydraulic brake pressure supplied from a master cylinder to rear wheel cylinders when the vehicle is being decelerated beyond a predetermined value, said hydraulic brake pressure control valve comprising:

(a) a valve housing including:

(1) at-least one inlet port to which the master cylinder is connected;

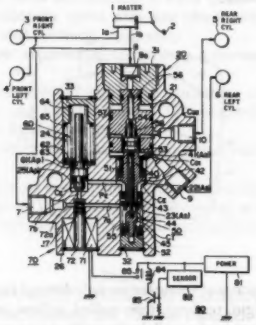
(2) at-least one outlet port to which the rear wheel cylinder is connected; and

(3) an enclosed pressure chamber within which a master cylinder hydraulic brake pressure is enclosed when the deceleration rate of the vehicle exceeds the predetermined value;

(b) control plunger means including a poppet valve responsive to pressure in said inlet port for restrictively controlling the inlet port pressure and for supplying the controlled pressure to the rear wheel cylinders through said outlet port, said control plunger means being urged in the direction that said poppet valve is opened in cooperation with said control plunger means when the vehicle deceleration rate is below the predetermined value but urged in the direction that said poppet valve is closed in cooperation with said control plunger means to reduce the volume of said enclosed pressure chamber when vehicle deceleration rate exceeds the predetermined value;

(c) enclosed chamber piston means disposed within said enclosed pressure chamber so as to sustain an enclosed hydraulic pressure applied thereto;

(d) first spring means for always urging said piston against the enclosed hydraulic pressure within said enclosed pressure chamber;



(e) second spring means for urging said piston means against the enclosed hydraulic pressure within said enclosed pressure chamber together with said first spring when said piston means is urged beyond a predetermined distance, spring constant of said second spring means being greater than that of said first spring means; and

(f) deceleration-sensitive means for generating an enclosed hydraulic brake pressure within said enclosed pressure chamber, said means being actuated when the deceleration rate of the vehicle exceeds the predetermined value,

whereby the enclosed pressure is controlled by said first weak spring in order to prevent the enclosed pressure from increasing excessively when the unloaded vehicle is decelerated and the enclosed pressure is controlled by both said first weak spring and said second strong spring in order to prevent the enclosed pressure from decreasing excessively.

4,502,736

VEHICLE WITH PNEUMATIC SUSPENSION

Neil M. Johnson, Chardon, Ohio, assignor to Traction Research, Inc., Chardon, Ohio

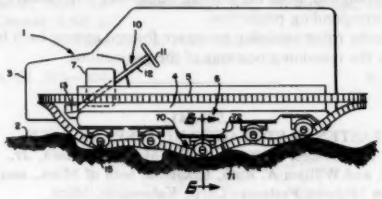
Filed Jul. 27, 1981, Ser. No. 287,050

Int. Cl.³ B62D *55/12, 55/16, 55/24*

U.S. Cl. 305—9 **70 Claims**

2. A vehicle, comprising a box-like chassis and suspension means for suspending said chassis relative to a surface, said suspension means comprising plural flaps beneath and connected to said chassis for pivotal movement, plural means for supporting the vehicle respectively connected to said flaps, and gas spring means positioned between said flaps and said chassis for spreading suspension forces over a major portion of said chassis, the pivot axes of said plural flaps extending generally parallel to the longitudinal axis of said chassis, said gas

spring means including plural air bags positioned between said flaps and said chassis for distributing force therebetween, and



each air bag being positioned between a plurality of said flaps and said chassis.

4,502,737

SLIDE WAY BEARING

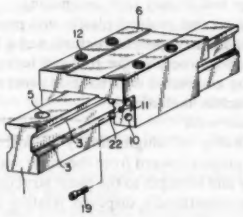
Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1982, Ser. No. 431,707

Claims priority, application Japan, Nov. 18, 1981, 56-170866[U]

Int. Cl.³ F16C *29/06*

U.S. Cl. 308—6 C **8 Claims**



1. A slide way bearing comprising

a track shaft having substantially planar bottom surface, opposite side surfaces and a top surface, the opposite side surfaces of the track shaft being formed with respective channels opposite to each other and extended in the longitudinal direction of the shaft, each channel being formed at its ends with respective first ball rolling grooves,

a slide member slidably mounted on the track shaft, the slide member having side portions which have opposite side surfaces opposed to the respective side surfaces of the track shaft and a top portion connecting the opposite side portions, each side surface of the slide member being formed with second ball rolling grooves opposed to the first ball rolling grooves of the track shaft, the slide member being formed with through-holes extended behind the second ball rolling grooves and lying in a plane therewith parallel with the bottom surface of the track shaft,

side plates fixed to the respective ends of each side portion of the slide member, each side plate being formed with means including grooves interconnecting the second grooves and the corresponding through-holes to form ball circulating paths together with the through-holes,

a plurality of balls disposed between the first and second grooves and in the circulating paths, and

the ends of the top portion of the slide member being slightly more extended in the longitudinal direction of the track shaft than the respective ends of the side plates.

4,502,738

WHEELED SUPPORT ASSEMBLY FOR CONVEYORS WITH LOCKING AND FASTENING FEATURE

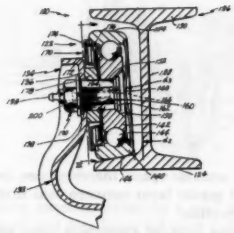
Randal W. Nauta, Grand Rapids, Mich., assignor to C. L. Frost & Son, Inc., Grand Rapids, Mich.

Continuation-in-part of Ser. No. 208,285, Nov. 14, 1980, Pat. No. 4,367,905. This application Dec. 16, 1982, Ser. No. 450,464

The portion of the term of this patent subsequent to Jan. 11, 2000, has been disclaimed.

Int. Cl.³ F16C *19/06*

U.S. Cl. 384—477 **20 Claims**



1. In a wheeled support assembly for conveyors of the type including a wheel having a plurality of rolling elements, an outer face and an inner race supporting the rolling elements because the races, an outer plug carried by the outer race and closing an outer face of said wheel, and support means for supporting an object to be transported on said assembly, the improvement comprising:

shaft means engaging said wheel and said support means for securing said wheel to said support means and preventing relative rotation of said inner race and said support means yet permitting ready removal of said wheel from said support means without removal of said outer plug, said shaft means comprising:

an elongated member having an outer surface which is noncircular in cross section and a head portion integral with said member, said inner race defining a recess opening towards said outer plug and a bore having a noncircular cross section, said support means defining an aperture having a noncircular cross section and said member extending through said inner race bore and into said support means aperture with the head portion disposed within said recess, said inner race bore and said support means aperture engaging said elongated member thereby to prevent relative rotation of said inner race, said elongated member and said support means; and

retaining means engaging said elongated member for retaining said elongated member to said support means and clamping said inner race between said head portion and said support means.

4,502,739

ROLLER BEARING SEAL

Hans Flander, Nuremberg, Fed. Rep. of Germany, assignor to GMN Georg Muller Nurnberg GmbH, Fed. Rep. of Germany

Filed Nov. 30, 1982, Ser. No. 445,421

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1981, 3147495

Int. Cl.³ F16C *33/78*

U.S. Cl. 384—481 **7 Claims**

1. A seal for a roller bearing having an outer race and an inner race, comprising

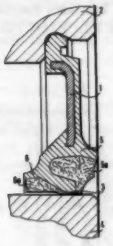
a ring-shaped member having a central axis, said ring-shaped member being integrally connected to the outer race,

an annular lip portion having a first predetermined inside diameter to provide a predetermined radial gap between said lip portion and said inner race, and

a first rim portion having an inside surface and sloping

toward said central axis, said first rim portion being concentric with said lip portion and extending in a first axial direction away from said lip portion,

said first rim portion having a free edge portion having a second predetermined inside diameter with respect to said central axis, greater than said first predetermined inside diameter, to define, together with said inner race, a first



substantially annular space therebetween for accommodating a first grease layer between said first rim portion and said lip portion,

said space having a radial dimension over its entire axial length which is substantially greater than said radial gap,

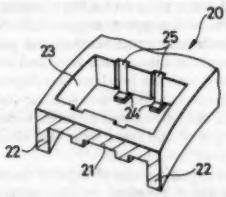
whereby said first space accommodates a layer of grease forming the first grease layer which is not subject to turbulence during operation of the roller bearing.

4,502,740

METHOD OF MAKING A RETAINER FOR SOLID TYPE ROLLER BEARING

Yukio Ohura, Kawaguchi; George Hatta, Fujisawa, and Tadao Nogawa, Ayase, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 20, 1982, Ser. No. 409,950
Claims priority, application Japan, Sep. 3, 1981, 56-137725
Int. Cl.³ F16C *33/46*; B21K *1/05*
U.S. Cl. 29—148.46 **2 Claims**



1. A method of manufacturing a retainer for retaining cylindrical rolling elements of a solid type roller bearing, comprising the steps of:

preparing an annular retainer member having a plurality of circumferentially spaced and radially directed rectangular holes formed therethrough and each defined by a pair of axially opposed end walls and a pair of circumferentially opposed end walls, said rectangular holes being formed with a pair of projections extending from each of said circumferentially opposed walls continuously over the outer to inner diameters thereof; and

inserting a single cutting edge member radially inwardly into said rectangular holes by a predetermined distance to cut and remove each said projection of a hole over the predetermined distance at the same time, the cutting edge member having a cutting edge body of rectangular cross-section of the size to be inserted into each of said rectangular holes, the cutting edge body being formed with two pairs of cutting edges projected from the opposed walls of the cutting edge body, each cutting edge being so dimensioned that when the cutting edge body is inserted into the rectangular hole the cutting edge may cut radially the corresponding projection,

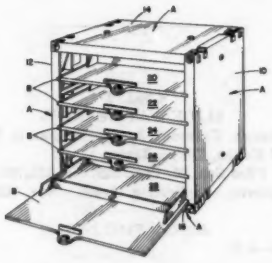
whereby roller retaining pawls are formed aroung each hole by the remaining portions of the projections.

4,502,741

FASTENER STORAGE AND DISPLAY RACK

Henry L. DeVries, Portage, Mich.; Myron A. Roth, Jr., St. Paul, and William A. Roth, Lakeland, both of Minn., assignors to Midwest Fasteners Corp., Kalamazoo, Mich.

Filed May 20, 1982, Ser. No. 380,221
Int. Cl.³ A47B *87/02*
U.S. Cl. 312—108 **17 Claims**



6. A storage and display rack comprising:

(a) first and second molded plastic side panel structures, a top molded plastic panel structure, and a bottom molded plastic panel structure, the top and bottom panel structures being connected with the side panel structures, each panel structure including:

(i) an outer wall;

(ii) a plurality of longitudinally disposed pairs of ribs which project inward from the outer wall for providing rigidity and strength to the panel structure, the rib pairs being symmetrically disposed relative to a transverse direction;

(iii) a plurality of projections which project inward from the outer wall between adjacent rib pairs for providing rigidity and strength to the panel structures;

(iv) a face portion projecting inward from the outer wall along a transverse edge of the panel structure, the face portion being connected with the rib pairs, each face portion having weakened breakout regions between the ribs within each pair, removal of breakout regions providing access channels through which dividers are slidable;

(v) a tongue means disposed along a longitudinal edge of the panel structure and a tongue receiving slot having an opening disposed along the other longitudinal edge of the panel structure, the tongue and tongue receiving slot being disposed relative to each other such that interconnecting the tongue means from one panel structure with the tongue receiving slot of another interconnects the two panel structures perpendicular to each other;

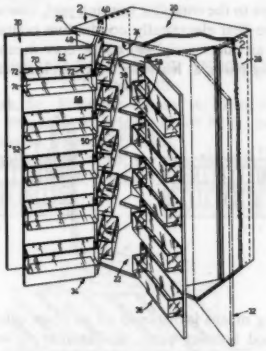
(b) the top, bottom, and side panel structures having their tongue means and tongue receiving slots interconnected such that the panel structures form a generally square cross-sectioned sleeve; and,

(c) at least one divider disposed between corresponding rib pairs of oppositely disposed panel structures, whereby the interior of the rack is divided into at least two compartments.

4,502,742
STORAGE UNIT

Paul J. Neff, 1143 Mississauga Rd., Mississauga, Ontario, Canada L5H 2J1

Filed Jan. 5, 1983, Ser. No. 455,633
Int. Cl.³ A47B 46/00
U.S. Cl. 312—324 9 Claims



1. A storage unit comprising:

an enclosure defining an internal storage space and an opening providing access to said space and disposed in a generally vertical plane;

at least one door hinged to the enclosure adjacent said opening and capable of closing the opening;

first and second pairs of panels, the panels in each pair being disposed in generally vertical planes and defining adjacent side edges, the panels being hinged together about said edges to permit the panels to selectively adopt a folded configuration in which outer faces of the panels are disposed inwardly towards one another, and an extended configuration in which inner faces of the panels are exposed; and,

a plurality of individual storage racks disposed on said inner faces of each of the panels;

inner ones of each pair of panels being hinged to respectively opposite sides of the enclosure at locations within said space selected to permit both pairs of panels to be (1) disposed in folded configurations and in generally co-planar and closely spaced relationship extending across substantially the entire width of said enclosure with said door closed and said racks on outer ones of said panels exposed behind the door, and (2) to be extended from the enclosure in said extended configuration when the door is open for permitting access to said storage racks.

4,502,743
GROUND BRACKET ASSEMBLY INCLUDING OMEGA SHAPED COMPRESSION MEMBER

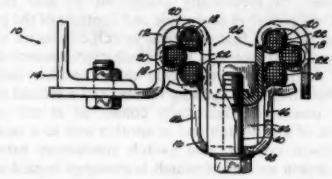
Hans J. Ziegler, 4828 N. Newhall St., Milwaukee, Wis. 53217

Filed May 16, 1983, Ser. No. 494,902
Int. Cl.³ H01R 4/66
U.S. Cl. 339—14 L 9 Claims

1. An electrical cable clamp for retaining multi-conductor cables having electrically conductive shields in fixed disposition and providing means for grounding the shields of those cables, the cable clamp comprising

a ground bracket body adapted to be connected to an electrical ground, said body being comprised of an electrically conductive metal strip, said metal strip being shaped so as to form a pair of forwardly opening spaced apart U-shaped channels adapted to house therein a plurality of multi-conductor cables, each of said channels including a rearward wall portion having opposite ends and a surface for supporting cables, and a pair of side walls integral with said rearward wall portion and extending forwardly from said rearward wall portion and extending generally perpendicularly to said rearward wall portion, the forward end of one of said side walls of one of said channels being joined by a web to a forward end of an adjacent side wall of an adjacent channel, said web including a bore,

means for compressing a plurality of cables together in electrically conductive relation and for forcing at least a portion of one of said cables against said ground bracket body in electrical contact, said means for compressing including



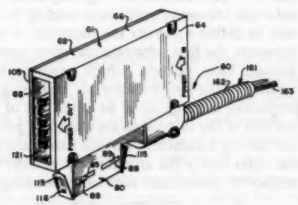
a compression member including a pair of spaced parallel legs, one of said legs being adapted to be insertable into one of said channels, said one of said legs including an end adapted to engage cables housed in said one of said channels and to force them together and against said ground bracket body and a second leg adapted to be inserted into the other of said channels, said second leg having an end adapted to engage said cables in said second channel and to force them together and against said ground bracket body, and

means for forcing said ends of said legs into said channels to compress the cables therein.

4,502,744
SWITCHING CABLE ASSEMBLY

Willard R. Garnett, Tupelo, Miss., and Robert L. Scofield, Memphis, Tex., assignors to Emerson Electric Co., St. Louis, Mo.

Continuation of Ser. No. 435,715, Oct. 21, 1982, abandoned, which is a continuation of Ser. No. 167,924, Jul. 14, 1980, abandoned. This application Nov. 22, 1983, Ser. No. 554,254
Int. Cl.³ H01R 3/04
U.S. Cl. 339—14 R 2 Claims



1. In a lighting system in which a plurality of lighting fixtures is electrically connected by a plurality of conductors and each of the said lighting fixtures contains a plurality of wires electrically connected to contacts for connection to a source of power, the improvement comprising a switching cable assembly including a generally rectangular housing adapted to be mounted on a said lighting fixture, said housing having top and bottom walls and oppositely disposed, substantially parallel long side walls, said side walls being narrow as compared with the length and width of the said top and bottom walls, a stem connector integral with and projecting from a said side wall of said housing, and a switch cable boss, integral with and pro-

jecting from a said side wall of said housing and defining a passage extending substantially parallel to the length of the said side wall, a power-in receptacle mounted in said housing and having a multiplicity of electrical contacts accessible to and adapted to mate with complementary contacts of a plug-in connector of a power-cable, a power-out receptacle mounted in said housing and having a multiplicity of electrical contacts accessible to and adapted to mate with complementary contacts of a plug-in connector of a connecting cable and a stem plug receptacle mounted in the stem of said housing and having a plurality of electrical contacts accessible to and adapted to mate with said lighting fixture wire contacts, electrical conductors electrically connected to and between contacts of the power-in receptacle and contacts of the power-out receptacle, and a first electrical switch conductor electrically connected at one end to a conductor connected to a contact of the power-in receptacle and at another end, to a switch remote from said lighting fixture, and a second electrical switch conductor electrically connected at one end to another side of said switch and at another end to a said stem plug receptacle contact, said switch conductors extending through a sheath an end of which is mounted in said switch cable boss passage.

4,502,745

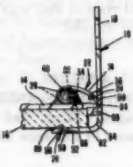
PROGRESSIVELY-INCREASING CLAMPING FORCE LEAD AND LEAD-SUBSTRATE ASSEMBLY

Richard A. Chavers, and Oland J. Duff, both of Atkinson, N.H., assignors to AT&T Technologies, Inc., New York, N.Y.

Filed Dec. 19, 1983, Ser. No. 562,510

Int. Cl.³ H01R *4/02*

U.S. Cl. 339—17 C **12 Claims**



1. A progressively-increasing clamping force lead, which comprises:

a stem portion;

first and second resilient clamping fingers projecting from the stem portion and having respective first and second substrate clamping portions extending in opposed relationship to define a gap for the reception of a substrate therebetween, the first substrate clamping portion including an arcuate loop portion which projects toward an inner surface of the second substrate clamping portion; and

a projecting locking tab at an outer end of the arcuate loop portion of the first substrate clamping portion, the locking tab having a camming surface extending at an angle from the outer end of the arcuate loop portion toward the inner surface of the second substrate clamping portion.

4,502,746

ELECTRICALLY CONDUCTING CONNECTOR FOR MUTUALLY ROTATABLE COMPONENTS

Helmut Wawra, Korb, and Wolfgang Schuliers, Weinstadt, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

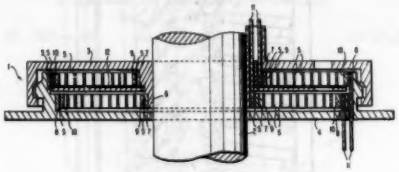
Filed Mar. 26, 1982, Ser. No. 362,053

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1981, 3111922

Int. Cl.³ H01R *39/00*

U.S. Cl. 339—3 S **4 Claims**

1. An electrically conducting connector for mutually rotatable components, the connector including a housing means formed of a first and second housing part, at least one spiral spring means formed of an electrically conductive material accommodated in the housing means, a core means provided on one of the housing parts for forming a winding for the at least one spiral spring means, one of the housing parts is mounted to one of the mutually rotatable components for rotation therewith, the other housing part is mounted on another of the mutually rotatable components so as to be fixed with respect to the rotatable housing part, characterized in that at least one first electrically conductive contact means is arranged on an outer periphery of the core means of said one of said housing parts, at least one second electrically conductive



contact ring means is disposed on an inner side of at least the other of said housing parts, and in that an inner and outer region of the spiral spring means respectively sliding rest under a spring tension against the first and second contact ring means,

means are provided for increasing the spring tension at least in the inner and outer end regions of the spiral spring means, wherein

the means for increasing the spring tension includes a clamping ring means adapted to act upon the inner end region of the spiral spring means and a spreader ring means adapted to act upon the outer end region of the spiral spring means.

4,502,747

PAD ARRAY SOCKET

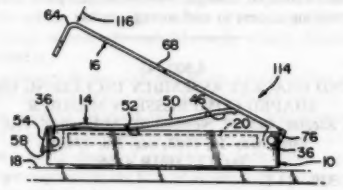
Edward J. Bright, Elizabethtown; Steven J. Kandybowski, Tower City; Wilmer L. Sheesley, Dauphin, and David B. Sisisi, Middletown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 391,621, Jun. 24, 1982, abandoned.

This application Apr. 18, 1984, Ser. No. 601,732

Int. Cl.³ H01R *9/09, 23/72*

U.S. Cl. 339—75 M **3 Claims**



1. A socket for mounting on a circuit board and for receiving a chip carrier, comprising:

a. a housing having a chip carrier receiving surface and a plurality of cavities extending therethrough;

b. a plurality of contact elements positioned in the cavities and having a spring section for engaging conductive pads on a chip carrier placed on the receiving surface;

c. a first frame having concavo-convex shaped side rails pivotally mounted to one side of the housing and adapted to be rotated down over a chip carrier on the receiving

surface with the convex surfaces of the side rails bearing thereagainst;

d. a second frame pivotally mounted on an opposite side of the housing for being rotated over the first frame; and

e. first latching means on the first frame at its hinged side and second latching means on the second frame at its free side, said latching means cooperating to latch the two frames together to retain and bias the chip carrier against the contact elements.

4,502,748

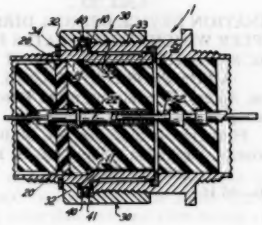
ANTI-DECOUPLING DEVICE FOR AN ELECTRICAL CONNECTOR

Robert W. Brush, Sr., Unadilla; Vincent A. Luca, Jr., Sidney, and Eric F. Shepler, Bainbridge, all of N.Y., assignors to Allied Corporation, Southfield, Mich.

Filed Nov. 21, 1983, Ser. No. 553,914

Int. Cl.³ H01R *13/623*

U.S. Cl. 339—89 M **5 Claims**



1. In combination with an electrical connector of the type having: a tubular housing; at least one electrical contact mounted in said housing; a coupling ring; means for rotatably mounting said coupling ring to said housing; at least one spring member having a projection; means for mounting one end of each spring member inside of said coupling ring so that said projection extends radially inwardly; and means for engaging the projection from said spring member to retard rotation of said coupling ring, the improvement wherein the means for engaging the projection from said spring member comprises:

an annular member having a plurality of slots around the periphery thereof, each slot being adapted to engage the projection on said spring member upon rotation of said coupling ring, said annular member being adapted to be radially expandable to increase its outside diameter in response to opposing axially applied forces; and

means for mounting said annular member to said housing.

4,502,749

COAXIAL CONNECTOR FOR MICROWAVE PACKAGES

Edgar W. Forney, Jr., Harrisburg, and Richard S. Hogendobler, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 1, 1983, Ser. No. 557,019

Int. Cl.³ H01R *17/18*

U.S. Cl. 339—177 R **8 Claims**

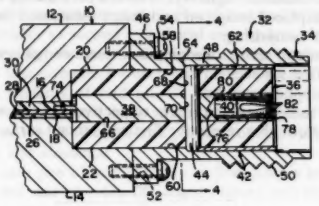
1. A coaxial connector, comprising:

an outer metal body member having a dielectric receiving bore extending therethrough which has an inner section and an outer section, the diameter of the inner section being smaller than the diameter of the outer section thereby defining a shoulder therebetween;

a dielectric member of substantially the same diameter as that of the inner section disposed along the dielectric-receiving bore and having a contact-receiving bore extending therethrough, a hole extending through said dielectric member in communication with said contact-receiving bore;

a center contact member disposed along said contact-receiving bore and having another hole extending therethrough in alignment with the hole in said dielectric member;

a dielectric securing pin disposed in said holes and having free ends extending outwardly from an outer surface of said dielectric member in engagement with said shoulder; and



a securing ring member disposed between said outer section and the outer surface of said dielectric member and in engagement with the free ends of said securing pin thereby securing said dielectric member and center contact in said body member.

4,502,750

ELECTRICAL CONNECTING STRAP FOR SEMICONDUCTOR COMPONENTS

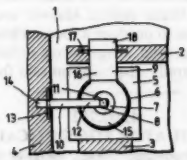
Arno Neidig, Plankstadt; Altan Akyürek, Heppenheim, and Hubert Hettmann, Hockenheim, all of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany

Filed Jul. 9, 1982, Ser. No. 396,652

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1981, 3127458

Int. Cl.³ H01R *4/02*

U.S. Cl. 339—275 R **10 Claims**



1. Connecting strap for electrically connecting a contact of a semiconductor component to a conductor run, comprising a bracket having two sides and two doubly bent ends, soldering lugs integral with said ends of said bracket, and lateral wings integral with one of said doubly bent ends of said bracket, said lateral wings being spaced from the conductor run and said lateral wings being extended transversely from said two sides of said bracket for positioning the connecting strap for connection to a conductor run.

4,502,751

LINEAR OPTICAL SCANNER

Thomas P. Fjeldsted, West Covina, and Alson E. Hatheway, Pasadena, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 15, 1983, Ser. No. 466,682

Int. Cl.³ G02B *27/17*

U.S. Cl. 350—6.4 **24 Claims**

1. A linear optical scanner adapted to receive light rays from object space, said light rays passing through said linear optical scanner in image forming relation, said linear optical scanner

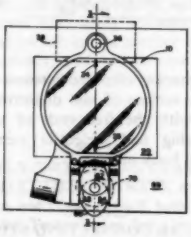
being adapted to periodically and reciprocally deflect said collimated light rays through a predetermined angle, said periodically and reciprocally deflected collimated light rays leaving said linear optical scanner and passing through an objective lens system to an image plane, said objective lens system having an optical axis incident on said image plane and being adapted to focus said periodically and reciprocally deflected collimated light rays to form a periodically and reciprocally displaced image on said image plane, said linear optical scanner comprising:

a first and second wedge prism, each wedge prism having:

a first surface,

an optical axis, and

a second surface, each respective optical axis passing through a respective first and second surface,



a pivot axis,

means for pivoting each respective wedge prism on a respective pivot axis and for positioning each respective wedge prism optical axis to direct said collimated light rays passing through said linear optical scanner to said objective lens system, and

means for periodically and reciprocally counter-rotating each respective wedge prism through a predetermined angle on each respective pivot axis, said wedge prisms having prescriptions adapted to produce reciprocal lateral displacement of said collimated light rays;

whereby, said linear optical scanner and said objective lens cooperate to produce a focused image on said focal plane, said focused image being periodically, reciprocally and laterally displaced on said focal plane.

4,502,752

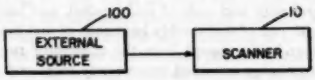
RESONANT ACTUATOR FOR OPTICAL SCANNING

Jean I. Montagu, Brookline, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Nov. 8, 1982, Ser. No. 439,925

Int. Cl.³ G02B *27/17*

U.S. Cl. 350—6.6 **16 Claims**



1. A resonant optical scanner device comprising

an armature which includes a movable, closed electrically conductive loop,

said armature being mounted to rotate about a support axis,

current inducing means associated with said electrically conductive loop comprising

a stationary flux-conductor extending through and in current-inducing relationship with said loop,

and drive means adapted to induce a magnetic current-inducing flux along said flux conductor in accordance with desired movement of said armature,

permanent magnet biasing means comprising

a permanent magnet adapted to produce a magnetic field with which current in said electrically conductive loop interacts to cause movement of said armature,

one pole of said magnet being permeably connected to one portion of said flux-conductor at a region remote from said electrically conductive loop,

and the other pole of said magnet being permeably connected with said flux-conductor via a permeable gap in which a segment of said electrically conductive loop is arranged to move,

whereby bias magnetic flux and current-inducing flux share in part the same permeable path along said flux-conductor,

an optical element attached to said armature in the vicinity of said support axis and arranged to receive a beam to be directed by said optical element, and

a circuit for controlling said drive means to produce a varying flux in said flux-conductor to induce a varying current in said closed movable electrical conductive loop to cause said armature and attached optical element to rotate back and forth about said support axis, in resonant scanning motion.

4,502,753

TERMINATION DEVICE USING A DIRECTIONAL COUPLER WHICH COMPENSATES FOR THE PARASITIC RADIATION FROM A LIGHT SOURCE VIA A COMPENSATION SIGNAL

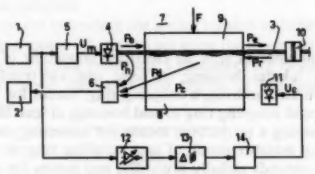
Alain Flocon, Antony, France, assignor to Telecommunications Radioelectriques T.R.T., Paris, France

Filed Jul. 22, 1982, Ser. No. 401,041

Claims priority, application France, Jul. 31, 1981, 81 14946

Int. Cl.³ G02B *5/14*

U.S. Cl. 350—96.16 **6 Claims**



1. A terminal device for an optical fiber used for two-way transmission of information, said device comprising a first light source coupled to one end of the optical fiber, means for modulating radiation emitted by said first light source with an information signal to be transmitted to the other end of said fiber, an optical detector, means for extracting radiation sent though said fiber from the other end thereof and directing said extracted radiation to said optical detector, a second light source arranged so that radiation emitted thereby is directed to said optical detector, second means for modulating the radiation emitted by said second source with a compensation signal, and means for deriving, from said information signal, said compensation signal of an amplitude and phase such that the radiation from said second source which is modulated by said compensation signal and is incident on said optical detector reduces interference due to parasitic modulated radiation from said first source reaching said optical detector.

2. The device according to claim 1 wherein the wavelength of the radiation emitted by said first light source and coupled to said one end of said optical fiber is equal to the wavelength of the radiation sent to said one end from the other end of said fiber.

4,502,754

OPTICAL FIBER INTERCONNECTION MECHANISM

Masao Kawa, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jan. 13, 1983, Ser. No. 457,701

Claims priority, application Japan, Jan. 19, 1982, 57-5210[U]

Int. Cl.³ G02B *5/14*

U.S. Cl. 350—96.20 **8 Claims**

1. An optical fiber interconnection frame for cross-connect-

ing optical transmission lines and optical communications equipment, said frame comprising:

a casing frame; and

a plurality of housing units stacked vertically in said frame, each of the housing units including:

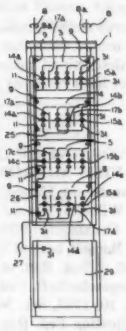
a top plate;

a bottom plate;

two opposed side plates;

a back plate having a plurality of fiber guide members;

a protecting cover plate removably mounted on the front of a corresponding housing unit;



at least one optical terminal plate arranged horizontally between said two opposed side plates and behind the protecting cover plate, terminal plate having a plurality of optical sockets for completing vertical connections of individual optical fibers to the individual optical sockets; and

a plurality of excess fiber-length stowage plates located at the rear of said terminal plate, each of said stowage plates extending in a vertical plane normal to said stowage plates, each of the stowage plates having a plurality of sets of radially arranged winding members for receiving excess lengths of said fibers connected to the optical sockets on said terminal plate.

4,502,755

REAR PROJECTION SCREEN

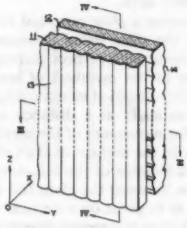
Leo Mori, Yokohama; Takashi Aoba, Ageo, and Mamoru Tominaga, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Dec. 16, 1982, Ser. No. 450,381

Claims priority, application Japan, Dec. 23, 1981, 56-208303

Int. Cl.³ G03B *21/60*

U.S. Cl. 350—128 **10 Claims**



1. A rear projection screen, comprising:

a pair of plates made of a transparent material and each having first and second surfaces;

a plurality of first cylindrical convex lens elements which respectively have longitudinal axes and convex surfaces, which are respectively integral with each of said pair of plates, and which are arranged continuously on said first surfaces of each of said pair of plates such that the longitudinal axes of said first lens elements of each plate are parallel to each other; and

a plurality of second cylindrical convex lens elements which respectively have longitudinal axes and convex surfaces, which are respectively integral with each of said pair of plates, and which are arranged continuously on said second surfaces of each of said pair of plates such that the longitudinal axes of said second lens elements of each plate are parallel to each other, each of said longitudinal axes of said plurality of second cylindrical convex lens elements being parallel to that of said plurality of first cylindrical convex lens elements for each said plate, and each of said convex surfaces of said plurality of second cylindrical convex lens elements being adapted to correspond to one of said convex surfaces of said plurality of first cylindrical convex lens elements;

wherein each pair of said plurality of first convex lens elements and said plurality of second convex lens elements which correspond to each other have a common optical axis, said convex surfaces of said plurality of first convex lens elements are respectively located at focal planes of said plurality of second convex lens elements, said convex surfaces of said plurality of second convex lens elements are respectively located at focal planes of said plurality of first convex lens elements, and said pair of plates are arranged so that the longitudinal axes of first and second convex lens elements of one of said plates are perpendicular to the longitudinal axes of the first and second convex lens elements of the other of said plates.

4,502,756

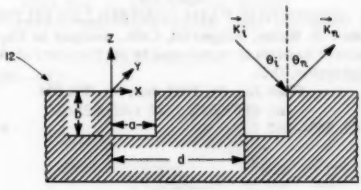
BANDPASS FILTER FORMED BY SERIAL GRATINGS OPERATING IN A WOOD'S ANOMALY REGION

Phillip R. Peterson, and Athanasios Gavrielides, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 30, 1982, Ser. No. 431,865

Int. Cl.³ G02B *5/18*

U.S. Cl. 350—162.2 **1 Claim**



1. A bandpass filter, comprising:

(a) a plurality of reflection gratings;

(b) said gratings being conductive and operating in a Wood's anomaly region;

(c) said gratings being arranged in serial relationship in two substantially parallel rows with the gratings in the one row being offset laterally from the gratings in the other row and the input to each grating being at substantially the same angle of incidence such that the output from a given one of said gratings in one row is the direct input to the next succeeding one of said gratings in the other row;

(d) said gratings being adapeed to receive polarized radiation and having grooves arranged substantially parallel to the magnetic field of said radiation; and

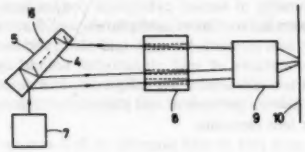
(e) said gratings being adapted to transmit the zeroth-order of diffraction of said polarized radiation but not the non-zero-orders of diffraction.

4,502,757

LIGHT BEAM DISTRIBUTOR AND AN ACOUSTO-OPTIC LIGHT MODULATING ELEMENT

Kiyoshi Maeda, Takatsuki, Japan, assignor to Dainippon Screen Manufacturing Co., Ltd., Kyoto, Japan

Filed Jul. 6, 1982, Ser. No. 395,438
Claims priority, application Japan, Jul. 14, 1981, 56-110440
Int. Cl.³ G02B *27/10, 5/04*
U.S. Cl. 350—173 **3 Claims**



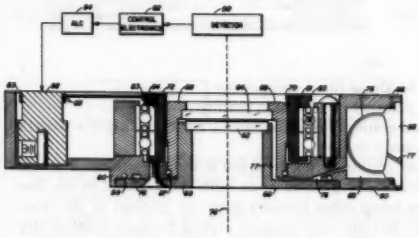
1. An optical system comprising: a light distributor, said distributor comprising a light transmitting block having a pair of opposed surfaces arranged in wedgewise configuration whereby when a single incident light beam is transmitted onto one surface thereof and into said distributor, the beam is split into a plurality of light beams emitted from the one surface as a result of repeated internal reflections between said pair of surfaces; laser light source means for emitting a laser beam positioned on one side of said light transmitting block for having a laser light beam therefrom intersect the one of said opposed surfaces of said block at an angle smaller than the angle at which the light beam impinges on the other of said opposed surfaces; and an acousto-optic light modulating element having a plurality of ultrasonic wave exciting portions arranged side by side, said modulating element disposed on the same side of the block as said laser light source means for having a plurality of converging split beams generated by said block from a laser beam from said laser light source means independently impinge respectively on said plurality of wave exciting portions.

4,502,758

ABSORPTION PATH CONTROLLED FILTER

Theodore B. Bailey, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 24, 1982, Ser. No. 391,894
Int. Cl.³ G02B *5/24;* G05D *25/00*
U.S. Cl. 350—267 **8 Claims**



1. An automatic light controlled absorption path filter for incident light comprising:

a first housing means with a window placed so that said incident light enters said window;

a second housing means with a window next to said window of said first housing means, said first and second housing means mounted together to form an adjustable volume between said windows;

a fluid reserve filled with a fluid that feeds said volume between said first and second housing means for keeping said volume full of a preselected fluid;

a drive housing connected to move said second housing means, to thereby vary the spacing and volume of fluid contained between said windows of said first and second housing means;

a motor connected to said drive housing;

a light detector placed to receive said incident light after it has passed through said windows of said first and second housing means; and

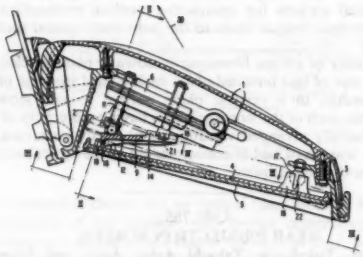
automatic light control means connected between said light detector and said motor, such that said motor adjusts said housing in a predetermined manner in response to the amount of incident light received by said light detector.

4,502,759

ADJUSTABLE SERVO-CONTROLLED OUTSIDE REAR VIEW MIRROR

Siegfried Herzog, Steinenbronn; Hans-Peter Jordan, Schonaich; Henryk Nölscher; Wilhelm Bauer, both of Sindelfingen; Christian Grabner, Gechingen; Wilhelm Klein, Aidlingen; Rolf Krügener; Max Bausch, both of Sindelfingen, and Gerard Nüssle, Aidlingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 10, 1983, Ser. No. 465,636
Claims priority, application Fed. Rep. of Germany, Feb. 11, 1982, 3204791
Int. Cl.³ G02B *7/18*
U.S. Cl. 350—636 **5 Claims**



1. An adjustable servo-controlled outside rear view mirror for vehicles, having a stationary mirror housing and a mirror shell carrying the reflector and able to move therein, a drive unit for the vertical and horizontal adjustment of the reflector which is detachably fixed in the mirror housing in the area of the back of the mirror shell,

said drive unit having a plate mounted thereby by ball and socket means, the plate being connected to the mirror shell for movement with respect thereto,

wherein movable driven members of servomotors engage the plate at points disposed substantially horizontally and substantially vertically at a distance with respect to a bearing point for movement of the members substantially at right angles to the surface of the reflector, characterized by the combination of the following features:

(a) the connection between the plate and the mirror shell is designed such as to pivot on a vertical axis but with torsional strength in a horizontal direction, so that length adjustment is possible in the horizontal direction between the plate on the one hand, and the mirror shell on the other;

(b) the mirror shell is mounted by a ball and socket means to the mirror housing on a separate, second, bearing point located in substantial horizontal alignment with the bearing point of the plate;

(c) the plate is disposed within the mirror housing in close proximity to a housing edge proximate the vehicle body, and the second bearing point in close proximity to a housing edge remote from the vehicle body.

4,502,760

ACCESSORY HOLDER MODULE FOR OPTICAL EQUIPMENT

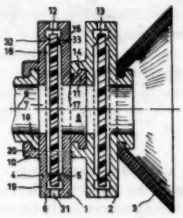
Jules Alfille, 13 Residence des Mourinoux, Avenue de la Redoute, 92600 Asnieres, France

Filed Mar. 2, 1983, Ser. No. 471,251

Claims priority, application France, Mar. 29, 1982, 82 05301

Int. Cl.³ G02B *7/00*

U.S. Cl. 350—318 **10 Claims**



1. An accessory holder module for optical equipment, the module comprising first and second plates, means for holding said plates substantially parallel to each other and face-to-face to leave an accessory-receiving space therebetween, each plate having an opening therethrough, said openings being substantially aligned along a common optical axis, complementary male and female snap-fitting means being fitted to the outside surfaces of said first and second plates respectively, and resilient gripping means integral with said plates and projecting into said space for resiliently gripping the lateral surface of an accessory when an accessory is inserted into said accessory-receiving space.

4,502,761

GRADIENT-FREE ILLUMINATION OF PASSIVE READOUT DISPLAY DEVICES

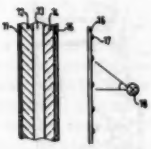
Peter Knoll, Ettlingen; Winfred König, Karlsruhe, and Wolfgang Ziegler, Eggenstein, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 8, 1982, Ser. No. 346,507

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1981, 3109643; Nov. 13, 1981, 3145127

Int. Cl.³ G02F *1/133*; G02B *27/00*; F21V *9/00*

U.S. Cl. 350—345 **10 Claims**



1. An illuminator for translucent illumination of liquid crystal information-display comprising a light source mounted in fixed relation to a passive readout display and a printed foil interposed therebetween having a pattern of opaque spots regularly spaced in two dimensions and providing darkening by variation in the size of said spots over area covered by said pattern, in a manner compensating for variations in the incident illumination provided by said light source to said display devices, whereby substantially gradient-free illumination of said passive readout display is produced.

4,502,762

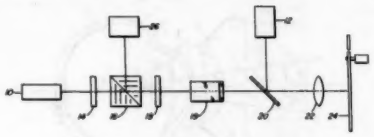
DUAL WAVELENGTH OPTICAL SYSTEM

Keith D. Anderson, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 12, 1982, Ser. No. 440,871

Int. Cl.³ G02B *5/30*

U.S. Cl. 350—394 **11 Claims**



1. An optical disc read-write system comprising a first laser source for producing read light at λ_1, and a second laser source for producing write light at λ_2 wherein an incident read beam path from the first source passes through a linear polarizer, to a polarizing beam splitter, through a retarder and through inclined first and second interference filters to an optical disc, a reflected read beam path passes from the disc through the inclined second and first interference filters and through the retarder to the polarizing beam splitter, and an incident write beam path from the second source is reflected from the inclined second interference filter to the disc, wherein the second interference filter is inclined to both of the incident read and write beam paths and transmits radiation at λ_1 and reflects radiation at λ_2 and wherein the first interference filter is inclined to the second interference filter at an angle which increases isolation of incident and reflected read light by the polarizing beam splitter.

4,502,763

WATERPROOF BODYTUBE FOR BINOCULARS AND THE LIKE

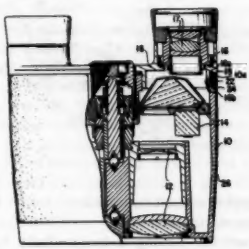
Fumio Shimizu, Minowa, Japan, assignor to Light Koki Co., Ltd., Nagano, Japan

Filed Aug. 10, 1982, Ser. No. 406,941

Claims priority, application Japan, Sep. 24, 1981, 56-141567[U]

Int. Cl.³ G02B *23/22*

U.S. Cl. 350—582 **1 Claim**



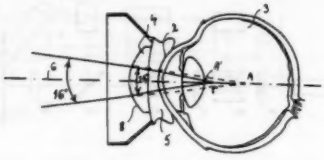
1. A waterproof nonround bodytube for binoculars and the like comprising a female bodytube having an end surface, a male bodytube having a projection portion fitting partially into said female bodytube and abutting said end surface, a packing inserted between said male bodytube and said female bodytube, a screw extending through a hole in said female bodytube and threadedly engaging the projection portion of said male bodytube, a packing sealing said screw, and a film covering on said female bodytube covering said screw.

4,502,764

CONTACT LENS FOR THE OBSERVATION AND TREATMENT OF A POINT IN THE EYE

Didier Riquin, Tours, France, assignor to Lasag AG, Thun, Switzerland

Filed Mar. 28, 1983, Ser. No. 479,710
Claims priority, application Switzerland, Apr. 16, 1982, 2317/82
Int. Cl.³ A61B 3/00; G02C 7/04
U.S. Cl. 351—160 R 10 Claims



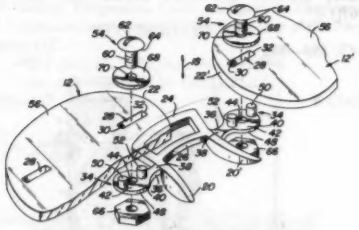
1. A contact lens for the observation and treatment by a coherent radiation beam of a working point in an eye, said contact lens comprising a symmetry axis, a spherical entry surface associated with Weierstrass points A and A' and a contact surface designed to be applied to the cornea of the eye, the optic centers of said entry and contact surfaces being situated on the symmetry axis of the lens, the radius of curvature of said entry surface being determined for the image of point A' by the rest of the contact lens and the parts of the eye crossed by the beam bringing the image of point A' to said working point, whereby said beam is focalized at said working point with minimal aberrations.

4,502,765

LENS SUPPORT SYSTEM

George F. Cooper, 2406 Halcyon Ave., Baltimore, Md. 21214

Filed May 13, 1982, Ser. No. 377,952
Int. Cl.³ G02C 1/02, 5/00
U.S. Cl. 351—110 9 Claims



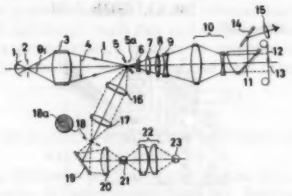
1. A lens support system comprising:
(a) a frame mounting member;
(b) a lens member having a longitudially extending slot passing therethrough, defining longitudinally displaced end sections; and,
(c) means for coupling said frame mounting member to said lens member, said coupling means including a pair of post members rigidly constrained each with respect to the other, said post members extending through said longitudinally extended slot in substantially mating engagement with said displaced slot end sections for preventing relative rotation of said coupling means with respect to said lens member about a vertically directed axis.

4,502,766

EYE INSPECTION APPARATUS WITH VARIABLE FIELD ANGLE

Yuji Ito, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 288,780, Jul. 31, 1981, abandoned, which is a continuation of Ser. No. 030,959, Apr. 17, 1979, abandoned. This application Jun. 27, 1984, Ser. No. 625,184
Claims priority, application Japan, Apr. 19, 1978, 53-47083; Apr. 26, 1978, 53-49618
Int. Cl.³ A61B 3/14; G03B 29/00
U.S. Cl. 351—206 22 Claims



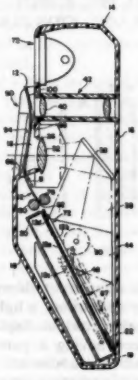
1. An eye inspecting apparatus comprising:
an eye inspecting system for inspecting the fundus of an eye to be examined including successively on an optical axis of the eye inspecting apparatus;
an objective optical member for forming the image of the fundus of the eye to be inspected;
a diaphragm;
a movable lens means which moves on the optical axis to cause a change in focal length;
a telephoto type lens group; and
an information recording means for recording the image of the fundus of the eye to be examined, said image being formed on an image plane; and
an illuminating system for illuminating the fundus of the eye to be examined.

4,502,767

METHOD AND APPARATUS FOR BLOCKING DIRECT AMBIENT FROM STRIKING SELF-DEVELOPING FILM UNIT

Bruce K. Johnson, Andover, and Charles W. Triggs, Marshfield, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 27, 1982, Ser. No. 453,877
Int. Cl.³ G03B 17/52
U.S. Cl. 354—86 10 Claims



1. A camera apparatus for exposing photographic film of the

self-developing type and for then processing a film unit to initiate formation of a visible image therein as it exits from the camera, the film unit being a relatively flat, flexible unit having on one side of the unit a light transmissive major surface and on the opposite side of the unit an opaque major surface, said apparatus comprising:

a camera housing including an exposure chamber, and an exit slot for allowing exiting of each exposed film unit from the housing;

means for processing each unit to initiate formation of a visible image therein and for advancing each film unit through said exit slot along a first path prior to completion of such image formation; and

means located on said housing in adjoining relation to said exit slot for redirecting and guiding each exiting film unit from the first path to a second path, at an angle to the first path, which is along an exterior portion of the housing so that the light transmissive surface is maintained close to and facing said exterior housing portion so that the light transmissive surface is blocked from direct exposure to the ambient light.

4,502,768

CAMERA WITH A BUILT-IN STROBO

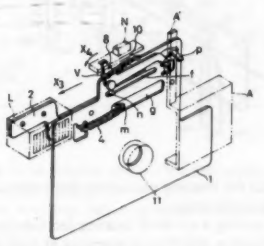
Kunio Tsuji, Nagaokakyo, and Naofumi Aoki, Takatsuki, both of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Apr. 26, 1983, Ser. No. 488,709

Claims priority, application Japan, Apr. 28, 1982, 57-62971[U]

Int. Cl.³ G03B *15/05*

U.S. Cl. 354—145.1 **2 Claims**



1. A camera with a built-in strobo comprising:

strobo means for flashing, said strobo means including a flashing portion mounted so as to be movable relative to said camera between operating and closed positions and which can operate when shifted to the operating position,

a lens cover mounted so as to be movable relative to a photographing lens between open and closed positions,

shifting means for shifting said flashing portion to said operating position,

operation means for controlling the operation of said shifting means, and

control means for controlling the operation of said operation means, said control means being operatively connected to said lens cover so that said flashing portion cannot be moved from its closed position until said lens cover is moved from its closed to its open position whereby movement of said flashing portion is controlled by the position of said lens cover.

4,502,769

QUICK-RETURN MIRROR DRIVING MECHANISM FOR SINGLE-LENS REFLEX CAMERAS

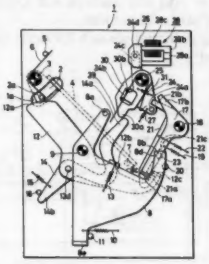
Masao Nakamori, and Yasuo Ishiguro, both of Tokyo, Japan, assignors to Copal Company Limited, Tokyo, Japan

Filed Mar. 9, 1983, Ser. No. 473,628

Claims priority, application Japan, Mar. 11, 1982, 57-38504

Int. Cl.³ G03B *19/12*

U.S. Cl. 354—152 **4 Claims**



1. In a quick-return mirror driving mechanism for single-lens reflex cameras comprising a side plate to form a mirror box, a reflecting mirror rotatably supported on said side plate and capable of moving between the down position and up position, a mirror-up operating member rotatably supported on said side plate and engageable with said reflecting mirror, and capable of moving between the cocked position to permit said reflecting mirror to be held in the down position and the uncocked position capable of bringing said reflecting mirror to the up position and a mirror-down operating member rotatably supported on said side plate and engageable with said mirror-up operating member and capable of moving between the uncocked postion and the cocked position capable of bringing said mirror-up operating member to the cocked position, an improvement comprises a first lock lever rotatably supported on said side plate and engageable with said mirror-down operating member and capable of locking said mirror-down operating member in the cocked position, a second lock lever rotatably supported on said side plate and engageable with said mirror-up operating member and capable of locking said mirror-up operating member in the cocked position, a first armature lever rotatably supported on said side plate and rotatably supporting thereon an armature and engageable with said first and second lock levers, a second armature lever rotatably supported on said side plate and operatively connected with said first armature lever, and a single electromagnetic device secured on said side plate and capable of making said armature attract thereto; said second lock lever being moved by said first armature lever through the first change of status of said electromagnetic device caused when a camera release button is pushed down, to unlock said mirror-up operating member; and said first lock lever being moved by said first armature lever through the second change of status of said electromagnetic device caused when the shutter closes, to unlock said mirror-down operating member.

4,502,770

MOTOR DRIVE CIRCUIT FOR STILL CAMERA

Katsuhisa Niwa, and Takahiro Ikeda, both of Osaka, Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Nov. 8, 1983, Ser. No. 549,730

Claims priority, application Japan, Nov. 10, 1982, 57-197022

Int. Cl.³ G03B *1/00, 17/36*

U.S. Cl. 354—173.11 **3 Claims**

1. A motor drive circuit for still camera comprising:

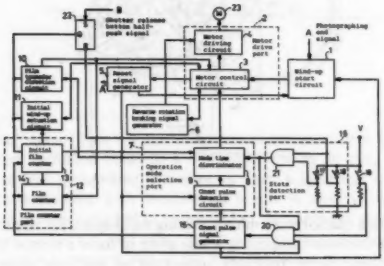
a motor which can be driven in rotational directions,

a motor drive part for causing said motor to rotate,

a mode control part for controlling said motor, which provides a first operation mode for making said motor to wind-up to transfer a film to a position for a first frame photographing after putting a film magazine into said still camera, a second operation mode for making said motor to wind-up said film after each photographing and a third operation mode for rewinding all the film after completion of photographing of all frames,

a state detection part for detecting states of filling of said film magazine in said still camera and complete closing of a back lid of said still camera,

a film running detection switch for detecting normal running of film, and



a mode time discriminator for setting a predetermined time responding to output signals of said state detection part and occurrence of either one of said first operation mode, said second operation mode or said third operation mode,

whereby said motor is controlled in such a manner that,

in case said state detection part detects that film magazine is not yet put in the right position of the camera or that the back lid is not completely closed the motor is stopped after a lapse of said predetermined short time,

in case one of said operation modes is selected by said mode control part, responding to result of operation of signal of said predetermined time and signal of said film running detection switch, the motor driving is controlled.

4,502,771

CAMERA WITH A VOICE TRANSMITTING DEVICE

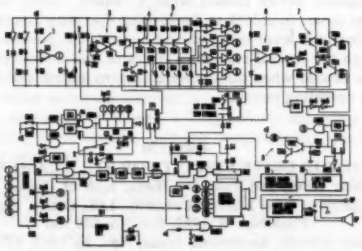
Makoto Katsuma; Akira Hiramatsu, both of Kanagawa, and Hiroyasu Murakami, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 4, 1983, Ser. No. 455,499

Claims priority, application Japan, Jan. 11, 1982, 57-1746; Jan. 11, 1982, 57-1748

Int. Cl.³ G03B *17/18*; G08B *7/00, 23/00*

U.S. Cl. 354—289.1 **1 Claim**



1. A camera comprising:

detection means for detecting a plurality of information in the camera, said detection means being arranged for generating signals corresponding to the the plurality of kinds of information;

means for weighting the degrees of importance of the signals corresponding to the plurality of kinds of information from the detection means, said weighting means having first means for producing signals of greater importance and second means to produce signals of lesser importance;

display means for displaying the informations of lesser importance visually in response to the signal from said second means;

sound warning means for producing sound warning of the information of greater importance in response to the signals from the first means;

signal generating means having a switch, said means being arranged for generating a warning signal in response to the switching operation of said switch; and

means for causing said sound warning means to produce a sound warning of information of lesser importance in response to the signals from said second means when it receives the warning signal from said signal generating means.

4,502,772

APPARATUS FOR TREATING DISC FILMS

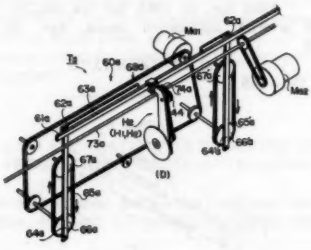
Nobuaki Mihara, Wakayama, Japan, assignor to Noritsu Kenkyu Center Co. Ltd., Wakayama, Japan

Filed May 13, 1983, Ser. No. 494,515

Claims priority, application Japan, May 17, 1982, 57-81470; Jun. 15, 1982, 57-101463

Int. Cl.³ G03D *3/08*

U.S. Cl. 354—312 **11 Claims**



1. Apparatus for treating photosensitive material in the form of a disc film comprising:

a dark box having a series of treating sections for conducting treatments of a disc film comprising at least a developing step, a bleaching step, a fixing step and a stabilizing step with washing steps interposed as appropriate between the respective steps;

a hanger having a supporting shaft to support at least one disc film;

a rotational force transmission means adapted to rotate said supporting shaft; and

a hanger transporting mechanism which is adapted to carry at least one hanger from an entrance to an exit of said dark box so as to allow treatments in respective steps of said disc film supported by said hanger;

said hanger transporting mechanism comprising:

a movable rail being disposed through said dark box from the entrance to the exit and adapted to hang said hanger in a cantilever fashion and to allow said hanger to slide in the longitudinal direction of said movable rail;

a driving member for bringing said movable rail into cyclical movement with each cycle comprising an upward movement, forward movement in the direction of said movable rail, downward movement and backward

movement in order, and further providing a dwell period for said hanger at the lowermost position; and

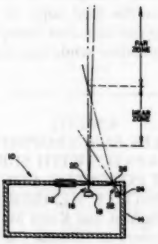
means for preventing the backward movement of said hanger by engaging said hanger at the lowermost position to keep it stationary during the backward movement of said movable rail but permitting said upward, forward and downward movements together with said movable rail.

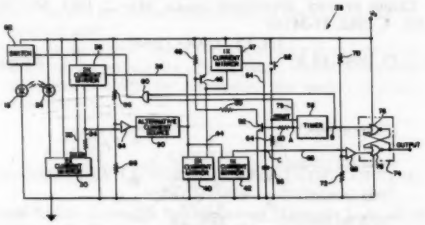
4,502,773

TWO ZONE INFRARED RANGING SYSTEM

John P. Gaewsky, Reading, and Joseph E. Murray, Jr., Malden, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 31, 1983, Ser. No. 462,669
Int. Cl.³ G03B *3/00*
U.S. Cl. 354—403 **10 Claims**





1. A dual zone ranging system for use with a photographic camera apparatus comprises:

means for emitting radiation toward a scene to be photographed;

means for detecting ambient radiation from the scene to be photographed and radiation emitted from said radiation emitting means and subsequently reflected from a subject in the scene to be photographed if the subject is located within a select distance range from the photographic camera apparatus and for providing an output responsive to the detected radiation; and

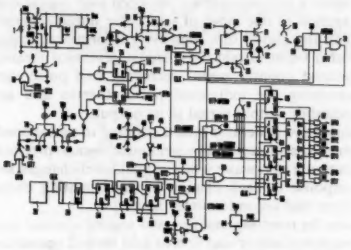
means for integrating the output from said detecting means for a first select period during which said radiation emitting means are rendered inoperative and for a second select period during which said radiation emitting means are rendered operative and for providing an output signal in response to said integration indicative of whether the subject in the scene to be photographed is located in said select distance range from the photographic camera, wherein the integration during one of said select periods is offset by the integration during the other of said select periods and said output signal indicative of whether the subject is located in said select distance range is provided in response to said offsetting integration.

4,502,774

BATTERY CHECK DEVICE FOR CAMERA

Ryoichi Suzuki, Kanagawa, and Ryuji Tokuda, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1983, Ser. No. 501,987
Int. Cl.³ G03B *7/26*; G08B *21/00*
U.S. Cl. 354—403 **9 Claims**



1. A camera comprising:

(a) a plurality of electrical loads including an electrical load for driving a photographic operation control mechanism of the camera;

(b) a voltage check circuit arranged to detect a power source voltage; and

(c) a driving circuit for supplying currents to at least two preselected electrical loads including said electrical load for driving a photographing operation control mechanism, said driving circuit being arranged for supplying a current which is smaller than a current required for driving a photographing operation control mechanism to said load for driving said mechanism; and

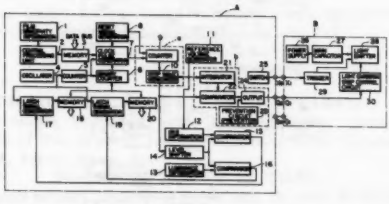
(d) a control circuit arranged to actuate said driving circuit when a battery check operation is to be performed by said voltage check circuit.

4,502,775

CAMERA FLASH PHOTOGRAPHING CONTROL DEVICE

Yoshifumi Kuroki, Tokyo, Japan, assignor to Asahi Kogaku Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 8, 1983, Ser. No. 464,894
Claims priority, application Japan, Feb. 7, 1982, 57-17635
Int. Cl.³ G03B *7/091, 15/05*
U.S. Cl. 354—416 **6 Claims**



1. A camera with a flash photographing control device, said camera generating a first, a second and a third operation control signal and a release pulse, said release pulse activating a flash unit and said release pulse being generated by said camera at a time intermediate said first and second operation control signals, said camera generating luminous information of a photographing object and iris information of a photographic lens both as analog information prior to the generation of said release pulse, and said camera generating film sensitivity infor-

mation in digital form and generating clock pulses, the control device comprising:

a first counter means receiving said clock pulses and producing digital count values based thereon;

a pulse signal generator means receiving said clock pulses and producing a related pulse signal train at a corresponding output, said pulse signal generator means including means for stopping said pulse signal train upon receipt of said third operation control signal from said camera and upon a correspondence between said digital count value applied to one input of said pulse signal generator means and the digital film sensitivity information applied at another input of said pulse signal generator means;

a second counter means receiving said pulse signal train, counting the individual pulses therein and applying a counting output signal at its output;

a step wave generator means coupled to said second counter means, said step wave generator means producing at its output a step wave whose signal level changes stepwise in response to each change of said counting output signal from said second counter means;

means for resetting said first and second counter means upon receipt of either said first or said second operation control signals generated by said camera;

means for generating two A/D conversion control signals corresponding to said luminous information and said iris information, respectively, said means for generating receiving said step wave and comparing the step wave level to the received analog luminous and analog iris information, respectively, and said means for generating applying at its output respective luminous and iris conversion control signals corresponding to the comparison; and

means for noting the digital count values generated by said first counter means upon receipt of said luminous and iris conversion control signals, respectively.

4,502,776

SORTING DEVICE FOR USE WITH A DOCUMENT REPRODUCTION MACHINE

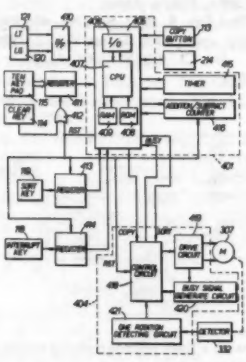
Hiroshi Matsumoto; Yoshiaki Nawata, both of Yokohama, and Tsuneo Toda, Urawa, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Mar. 2, 1982, Ser. No. 353,932

Claims priority, application Japan, Mar. 31, 1981, 56-46163

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 SH **3 Claims**



1. A document reproduction machine comprising:

input means for receiving an instruction from an operator to produce a selected number of copies of a document;

operating means responsive to said input means for producing the copies in response to the instruction;

timing means responsive to the condition of said operating means for generating a signal when said operating means has not produced a copy for a predetermined length of time;

discharge means connected to said operating means for discharging the copies;

sort means proximate said discharge means for sorting the discharged copies when said machine is operating in a sort copying mode, said sort means including a plurality of sorting bins to store the discharged copies and moving means for moving said sorting bins relative to said discharge means;

nonsort means proximate to said discharge means for storing the discharged copies when said machine is operating in a nonsort copying mode;

control means connected to said timing means and said moving means for switching said machine from one of said copying modes to the other when said timing means generates the signal by activating said moving means; and

interrupt means connected to said operating means and said input means for allowing said operating means to produce copies of a second document in response to a second instruction before the final copy of a first document is produced in response to a first instruction, said interrupt means being inoperative while said machine is in the sort copying mode.

4,502,777

TRANSFER TYPE ELECTROPHOTOGRAPHIC COPYING APPARATUS WITH SUBSTANTIALLY CONSTANT POTENTIAL CONTROL OF PHOTOSENSITIVE MEMBER SURFACE

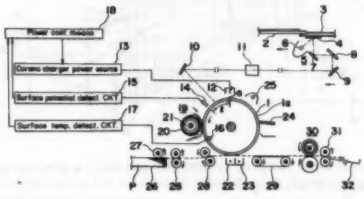
Hiroshi Okamoto, Shinshiro, and Kouzi Matsushita, Toyokawa, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 14, 1982, Ser. No. 368,448

Claims priority, application Japan, May 2, 1981, 56-67512; Mar. 4, 1982, 57-34768

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 R **4 Claims**



1. A transfer type electrophotographic copying apparatus which comprises an electrographic photosensitive member which is repeatedly utilized for formation of electrostatic latent images thereon, an image forming means for forming an electrostatic latent image on a surface of said photosensitive member, a condition detecting means for detecting conditions affecting operating characteristics of said photosensitive member, a determining means including means for determining a state of operation of said image forming means according to said conditions detected by said detecting means by determining if said conditions are in a predetermined relationship which is specifically represented by a predetermined reference equation, a correcting means for correcting said state of operation of said image forming means so that a potential of said electrostatic latent image formed on said surface of the photosensitive member is made substantially constant, and a means for successively revising said reference equation based both on said conditions detected by said detecting means and said state of operation which has been corrected by said correcting means, said revising means revising said reference equation through substitution of the coefficients of the reference equation by

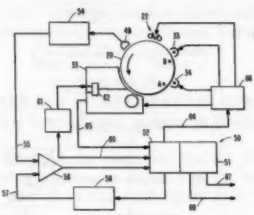
newly calculated ones, by calculating the coefficients of the reference equation based on both the condition detected by said detecting means and the state of operation corrected by said correcting means.

4,502,778

SYSTEM FOR MONITORING AND CONTROLLING ELECTROPHOTOGRAPHIC TONER OPERATION

John H. Dodge, Thornton; Thomas F. Eichhorn, Boulder County, and Peter A. Stevenson, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1982, Ser. No. 453,847
Int. Cl.³ G03G *15/00*
U.S. Cl. 355—14 E **11 Claims**



1. In a copier having a sensor for producing an output signal indicative of the reflectivity of the photoconductor thereof and means for establishing a test patch on the photoconductor, an improved method comprising the steps of:

sampling the output of said sensor a plurality of discrete times as said patch moves past said sensor;

storing signals indicative of the result of each of the discrete samples; and

averaging the stored signals for producing a signal representative of the reflectivity of said patch, whereby the average signal is usable for determining the quality of operation of the copier.

4,502,779

CLEANING DEVICE FOR ELECTROSTATIC COPYING MACHINES

Hiroshi Kajita; Tadanobu Nakajima, and Masahide Iseki, all of Osaka, Japan, assignors to Mita Industrial Company Limited, Osaka, Japan

Filed Nov. 16, 1982, Ser. No. 442,049
Claims priority, application Japan, Nov. 27, 1981, 56-191276
Int. Cl.³ G03G *15/00, 21/00*
U.S. Cl. 355—15 **7 Claims**

1. An apparatus for use in an electrostatic copying machine of the type having a movable photosensitive member, for cleaning residual toner from the photosensitive member, said apparatus comprising:

a cleaning blade adapted to be brought into sliding contact with the photosensitive member upon movement thereof;

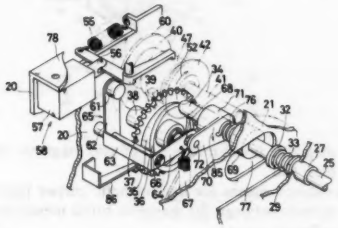
a support shaft supporting said blade;

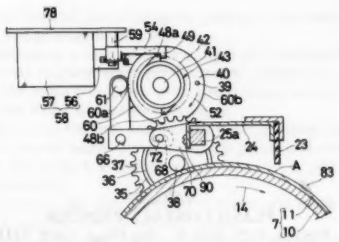
means for mounting said support shaft such that the longitudinal axis thereof extends orthogonally of the direction of movement of the photosensitive member and such that said support shaft is rotatable about said axis and is movable longitudinally thereof;

a rotational member rotatable about a first axis parallel to said longitudinal axis;

first means for converting rotation of said rotational member into longitudinal movement of said support shaft along said longitudinal axis, said first means comprising a face cam rotatable about a second axis parallel to said first axis, said face cam having a first cam face extending circumferentially around said second axis and of varying length in directions parallel thereto, a first cam follower on an end of said support shaft, means for urging said support shaft along said longitudinal axis such that said first cam follower is resiliently urged against said first cam face, a gear coaxially integral with said face cam, a disk rotatably mounted about said first axis, a pin located eccentrically on said disk to engage a tooth of said gear, and means for transmitting rotation of said rotational member to said disk, such that upon rotation of said disk, said pin rotates said gear and said face cam, and said face cam moves said support shaft axially against said urging means;

second means for converting rotation of said rotational member into angular movement of said support shaft





about said longitudinal axis, said second means comprising an annular eccentric second cam face of said disk, said second cam face having a varying radial dimension, a pivotally mounted lever having first and second ends, means coupling said first lever end to said support shaft, and a second cam follower on said second lever end and urged against said second cam face, such that rotation of said disk pivots said lever, thereby rotating said support shaft about said longitudinal axis and moving said blade toward the photosensitive member; and

third means for rendering inoperative said transmitting means, thereby preventing rotation of said disk.

4,502,780

PHOTOCONDUCTOR CLEANING APPARATUS

Kohji Suzuki, Yokohama; Hideo Yoo, and Yoshio Takamiya, both of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

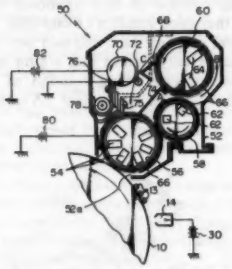
Filed Sep. 12, 1983, Ser. No. 531,511
Claims priority, application Japan, Sep. 20, 1982, 57-164691; Dec. 23, 1982, 57-194041[U]
Int. Cl.³ G03G *15/08*
U.S. Cl. 355—15 **10 Claims**

1. A cleaning apparatus for removing and collecting untransferred residual toner particles from a photoconductor by means of magnetic brushes which are formed by magnetic carrier particles, said apparatus comprising:

magnetic brush means for removing the residual toner particles from the photoconductor by causing the residual toner particles to be adsorbed by the magnetic carrier

particles which are charged to a polarity opposite to a charge polarity of the residual toner particles;

toner collector means for collecting the residual toner particles adsorbed by the magnetic carrier particles in said



magnetic brush means out of said magnetic carrier particles; and

circulation means for the magnetic carrier particles which extends between the magnetic brush means and the toner collector means.

4,502,781

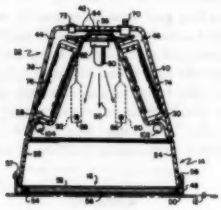
FLASH CONTACT PRINTER

Tan V. Nguyen, 4425 Arch St., San Diego, Calif. 92116

Filed May 2, 1983, Ser. No. 492,182

Int. Cl.³ G03B *27/02*

U.S. Cl. 355—79 **14 Claims**



1. A contact printer for a photographic medium, said printer comprising:

a housing defining an opaque enclosure having a generally rectangular end and an exposure window formed in and covering said entire end,

an exposure light disposed in said housing spaced from said window,

a timing circuit for timed activation of said light,

a transparent cover for said exposure window,

a printing mask for mounting in said window, and

a quick detachable holder releaseably engaging said housing around the periphery of said window for detachably mounting said transparent cover and said printing mask in overlying relationship over said window.

4,502,782

METHOD AND LASER APPARATUS FOR MEASURING VISUAL RANGE, SLANT VISUAL RANGE AND CLOUD ALTITUDE

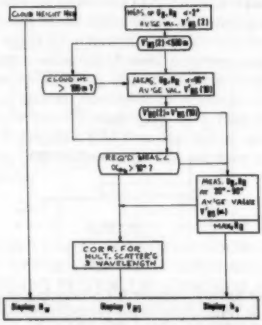
Christian Werner, Munich, and Michael Klier, Puchheim, both of Fed. Rep. of Germany, assignors to Deutsche Forschungs- und Versuchsanstalt für Luft-und Raumfahrt e.V. Linder Höhe, Cologne, Fed. Rep. of Germany

Filed Jan. 19, 1981, Ser. No. 226,470

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1980, 3002791

Int. Cl.³ G01C *3/08*; G01N *21/00*

U.S. Cl. 356—5 **1 Claim**



1. Method of measuring visibility range, slant visibility range and cloud height for air navigation assistance by use of a pulse transmitter and a photo-detector-equipped receiver for receiving laser pulses back-scattered by an aerosol, in which a signal voltage (U_R) dependent on the properties of said aerosol and the range (R_R) of the backscattering aerosol determined from the propogation time of the laser pulses between transmission and reception are measured for a first reference point and in which a voltage (U_B) of received laser pulses and a corresponding range (R_B) is measured for a second reference point in the neighborhood of the transmitter for determination of the maximum range measurable with the laser transmitter, and the measurements for said first and second reference points are stored in a computer for further evaluation, said method also including the improvement whereby additional measurements are made at different elevation angles in order to detect atmospheric layering and, in the event of detection of layering, to furnish results relating thereto to said computer for correction of slant visibility range computation.

4,502,783

ALIGNMENT STABILIZATION PRISM

Anthony S. Y. Lau, Culver City, and Ernest W. Gossett, Jr., Glendora, both of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Filed Dec. 3, 1981, Ser. No. 326,987

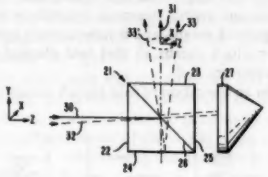
Int. Cl.³ G01B *11/26*

U.S. Cl. 356—152 **11 Claims**

1. An optical device capable of three-dimensional beam stabilization, comprising:

a beamsplitter having an input surface, an output surface having a juncture with said input surface, a partially reflecting surface which extends diagonally through said beamsplitter from the juncture between said input and

output surfaces, a totally reflecting third surface and a fourth surface having a juncture with said third surface,



said partially reflecting surface extending to the juncture between said third and fourth surfaces; and

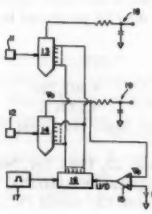
a corner cube optically coupled to said fourth surface.

4,502,784

ANALYZER COMPENSATION CIRCUIT

Masaru Tanaka, Kyoto, Japan, assignor to Horiba, Ltd., Kyoto, Japan

Filed Jul. 23, 1982, Ser. No. 401,270
Claims priority, application Japan, Sep. 17, 1981, 56-148413
Int. Cl.³ G01J *1/18;* G01N *21/17*
U.S. Cl. 356—222 **2 Claims**



1. An analyzer output compensation circuit comprising:

a compensating detector for converting a light incident thereon into an electrical signal output;

a measuring detector for converting a light incident thereon into an electrical output signal;

first and second D-A converters of the multiplying type, said first converter connected to said measuring detector, and said second converter connected to said compensating detector;

an up/down counter having its digital outputs operatively connected in parallel to said first and second converters;

a clock pulse generator means for providing clock pulses to said up/down counter;

a reference voltage;

a voltage comparator having its output operatively connected to said up/down counter's control input, said comparator's inputs respectively connected to said reference voltage and to an output of said second converter;

wherein said first converter output corresponds to the multiplication of the count stored in said up/down counter multiplied by the output of said measuring detector and the output of said second converter corresponds to the count stored in said up/down counter multiplied by the output of said compensating detector;

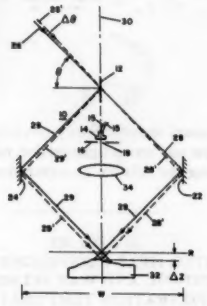
and wherein said up/down counter is controlled by said comparator to count either up or down to enable said output of said second converter to be equal to said reference voltage and simultaneously the first converter receives the same count stored in said up/down counter, and said measuring detector output is available as a compensated analyzer output, whereby fluctuations of the intensity of said lights is compensated for.

4,502,785

SURFACE PROFILING TECHNIQUE

Bruce E. Truax, Durham Township, Middlesex County, Conn., assignor to AT&T Technologies, Inc., New York, N.Y.

Filed Aug. 31, 1981, Ser. No. 298,220
Int. Cl.³ G01B *11/24*
U.S. Cl. 356—376 **6 Claims**



1. A method of determining the profile of the surface of an object, comprising the steps of:

(a) impinging a narrow beam of light on a beamsplitter at a known incident angle (θ) thereto to reflect a first portion of the beam therefrom while permitting a second portion of the beam to pass therethrough;

(b) directing the first and second beam portions along first and second paths symmetric to the plane of the beamsplitter and in such a direction as to intersect in said plane of symmetry;

(c) adjusting the distance (ΔZ) between said beam intersection and the surface of said object;

(d) varying the incident angle (θ) until at least one of said first or second beam portions impinges on the surface of the object intersected by said plane of symmetry;

(e) determining the distance (ΔZ) from a reference plane (R), normal to the plane of symmetry, to the surface of the object based upon the change ($\Delta\theta$) of the incident angle (θ) of the beam; and

(f) repeating steps (c), (d) and (e) to determine the profile of the surface of the object at other locations.

4,502,786

METHOD AND APPARATUS FOR AUTOMATED DETERMINATION OF HEMOGLOBIN SPECIES

Tipton L. Golias, Beaumont, and William T. Mostyn, Jr., Waco, both of Tex., assignors to Helena Laboratories Corporation, Beaumont, Tex.

Filed Dec. 26, 1979, Ser. No. 106,438
Int. Cl.³ G01N *21/00*
U.S. Cl. 356—435 **17 Claims**

1. Apparatus for simultaneously determining the relative concentration of two solutions each of unknown concentration comprising:

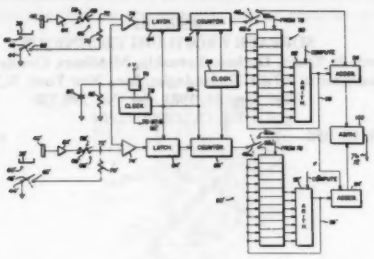
a single source of light;

a source of reference voltage;

first conversion means responsive to the source of reference voltage and to the amount of light from said light source transmitted through one of said two solutions of unknown concentration for repeatedly determining the concentration of said one solution;

second conversion means responsive to said source of reference voltage and to the amount of light from said light source transmitted through the other of said two solutions

of unknown concentration for repeatedly determining the concentration of said other solution; and



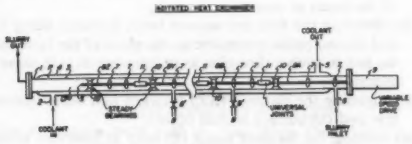
arithmetic means simultaneously receiving inputs from each of said first and second conversion means for repeatedly determining the relative concentration of said two solutions.

4,502,787

AGITATED HEAT EXCHANGER TO CHILL SOLVENT-OIL AND WAX SLURRY TO WAX FILTRATION TEMPERATURE

Thomas E. Broadhurst, Sarnia, Canada, assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 245,712, Mar. 20, 1981, Pat. No. 4,441,987.
This application Dec. 5, 1983, Ser. No. 558,175
Int. Cl.³ B01F *15/06*
U.S. Cl. 366—149 **6 Claims**



1. A high agitation heat exchanger apparatus comprising a double wall heat exchanger wherein chilling fluid flows through the passage way defined by the inner and outer walls of the heat exchanger and the material to be chilled flows through the central passageway defined by the inner walls of the exchanger, and an agitation means mounted in the central passageway of the exchanger wherein the agitation means comprises a supported, articulated multi-section shaft having multiple blades radially attached thereto, one end of said multi-section shaft being coupled to a drive means, wherein the section of the multi-section shaft are connected one to the other by articulation means and the support is provided by steady bearings attached to the sections of the multi-section shaft, the steady bearings being sized so as to just slide into the central passageway of the heat exchanger and remain motionless therein without being secured to the internal walls of the heat exchanger.

4,502,788

TIME KEEPING AND RECORDING DEVICE

Colin B. Lowden, P.O. Box 1048, Ponoka, Alberta, Canada T0C 2H0

Filed Oct. 12, 1983, Ser. No. 541,148
Int. Cl.³ G04B *47/00*; G04F *8/00*; G07C *1/10*
U.S. Cl. 368—10 **17 Claims**

1. A time keeping and recording device, comprising:

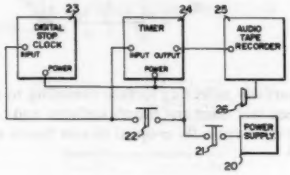
(a) a stop clock operable for measuring and displaying an elapsed time between starting and stopping said stop clock;

(b) audio recording means operable to record spoken messages; and

(c) circuit means including switch means operably connected to said stop clock and to said recording means;

(d) wherein said switch means is operable to reset and start said stop clock means, and is subsequently operable to stop said stop clock means so that said elapsed time may be read therefrom; and

(e) wherein an operation of said switch means to either reset



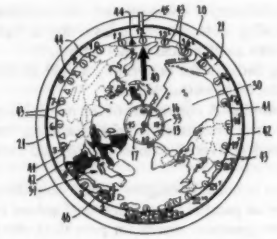
and start said stop clock or to stop said stop clock simultaneously enables said recording means to record a spoken message; whereby a user may reset and start said stop clock and record a first spoken message comprising particulars of an activity being initiated, and said user may subsequently stop said stop clock and record a second spoken message comprising the displayed elapsed time; whereby a record of said user's activities over an extended period of time may be produced by said audio recording means.

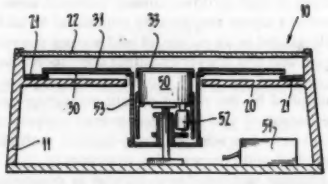
4,502,789

CLOCK

Alan L. Heath, 1319 Main Rd., East Eltham, Victoria 3095, Australia

Filed Aug. 22, 1983, Ser. No. 525,239
Claims priority, application Australia, Sep. 14, 1982, PF5881
Int. Cl.³ G04B *19/22*
U.S. Cl. 368—27 **8 Claims**





1. A clock for indicating time in effectively all countries and time zones of the world, the clock comprising a timing mechanism and a clock face having thereon an annular scale providing a visual indication of a twenty four hour clock, the timing

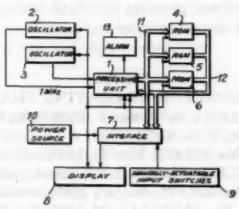
mechanism being coupled to a rotatable hour indicator, the hour indicator comprising a disc, the front surface of which carries a special projection of the world showing the time zones of the world and indicator means for each zone, the projection of the world covering the front surface of the disc except a transparent central portion that reveals a minute indicator means, the special projection of the world being centred at the south pole and the countries and time zones of the world being geographically presented in accurate longitude but adjusted latitude to ensure geographical recognition of countries, each time zone of the world being visually differentiated by use of colours and the projection of the world being substantially free of geometric markings; whereby the disc is arranged to complete one revolution every twenty four hours to in use provide a visual indication of the time in any particular time zone of the world by reading the hour on the scale which is radially adjacent to the particular zone indicator means and determining the exact time from the minute indicator means.

4,502,790

ELECTRONIC TIMEPIECE

Hiroyuki Yokoyama, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 932,588, Aug. 10, 1978, abandoned. This application Feb. 3, 1981, Ser. No. 231,080
Claims priority, application Japan, Aug. 10, 1977, 52-96366
Int. Cl.³ G04B *17/12, 17/20*
U.S. Cl. 368—200 **16 Claims**



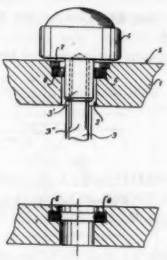
1. An electronic timepiece comprising oscillator means for supplying a time-standard signal; display means for displaying at least time; processing means for converting said time-standard signal into a time display signal for driving said display means; temperature-detecting means connected with said processing means for conveying a signal representative of temperature to said processing means; memory means coupled to said processing means and storing data representative of the amount of time correction required for each temperature, said processing means being adapted to effect correction of said time standard signal for temperature-induced errors to produce a corrected time display signal, and further memory means storing further data representative of time correction due to aging of said oscillator means, said processing means being adapted to selectively modify said first-mentioned data in said first-mentioned memory means by said further data, the amount of said time correction being at least in part determined by said data stored in said first-mentioned memory means.

4,502,791

WATER-RESISTANT DEVICE BETWEEN AN OUTSIDE CONTROL MEMBER AND A WATCH CASE

Pierre Goy, Vaud, Switzerland, assignor to Jean Lassale S.A., Carouge, Switzerland

Continuation-in-part of Ser. No. 313,189, Oct. 20, 1981,. This application May 2, 1983, Ser. No. 490,207
Claims priority, application Switzerland, Nov. 10, 1980, 8324/80; Jun. 29, 1981, 4270/81
Int. Cl.³ G04B *37/00*
U.S. Cl. 368—289 **2 Claims**



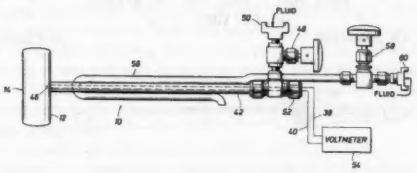
1. An extra-thin watch case of precious metal having a wall having a hole therethrough, a winding crown disposed entirely outside the case and overlying one outermost surface of the case and overlying said hole, an internally screw threaded pedestal secured to the crown and extending into the hole, an externally screw threaded winding stem screwed into the pedestal, an annular groove in said wall within said hole, the groove having a depth approximately equal to its height, the height of the groove being less than one third the thickness of the wall, the groove being limited on both sides by a part which is of the same precious metal as the case and which is fast with the case, and a supple toric gasket in the groove and surrounding and contacting said pedestal.

4,502,792

APPARATUS FOR CALIBRATING A PYROMETER

Paul D. Hunsucker, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 20, 1982, Ser. No. 450,829
Int. Cl.³ G01K *15/00*
U.S. Cl. 374—1 **12 Claims**



1. A method for calibrating an optical or radiation pyrometer used to measure a surface temperature of a furnace tube, comprising, inserting a target having cooling channels therein by means of a handle into the furnace near the furnace tube, whereby the target is in substantially the same furnace environment as the tube; controlling the temperature of the target by air flowing through said channels in the target, wherein said air is supplied to said channels by said handle at an adjustable rate; determining the surface temperature of the target with a thermocouple in the target and with said pyrometer; and comparing the temperature determined by said thermocouple to the temperature measured by the pyrometer on the surface of the

target to determine a correction factor to be applied to the pyrometer.

4,502,793

APPARATUS AND METHOD FOR MEASURING TEMPERATURE PROFILE

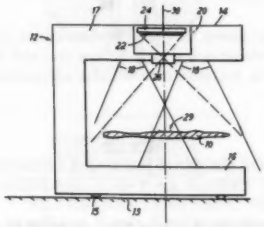
Kenneth B. Smith, Tuffley, and Derek W. Adams, Cheltenham, both of England, assignors to Schlumberger Electronics (UK) Limited, Farnborough, England

Filed Nov. 23, 1982, Ser. No. 443,989

Claims priority, application United Kingdom, Nov. 25, 1981, 8135559

Int. Cl.³ G01J *5/10, 5/08*

U.S. Cl. 374—124 **9 Claims**



2. Apparatus for measuring the temperature profile across the width of a strip of moving material, comprising a row of elements sensitive to thermal radiation mounted so as to be rotatable about an axis to which the row is transverse, the row being rotatable between a first position in which the row is transverse to the direction of movement of the strip, and a second position in which the row is aligned with the direction of movement of the strip, and signal processing circuitry responsive to electrical signals from the said elements and having a first mode operative in said first position of the row of elements in which signals from groups of one or more of the said elements are normalized in accordance with stored normalizing constants individual to the said groups, and a second mode operative in said second position of the row of elements, to determine said normalizing constants by comparing the signals from the said elements with a reference temperature signal.

4,502,794

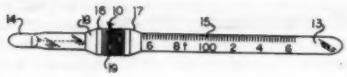
THERMOMETER MOUTHPIECE DEVICE

Patrick A. Leverty, 806 Mac Beth Cir., Lakeville, Minn. 55044

Filed Mar. 7, 1983, Ser. No. 472,966

Int. Cl.³ G01K *1/14*

U.S. Cl. 374—194 **20 Claims**



1. An aerodynamic thermometer mouthpiece device for releasably holding a thermometer and for engaging the teeth of a user, said device comprising a unitary, elongated body portion having tapered front and rear portions, said elongated body portion being of a resilient construction and having a circumferentially disposed ribbed center portion for engaging the teeth of a user, said elongated body portion further having a thermometer holding and securing means extending therethrough for receiving and frictionally engaging the exterior surfaces of a thermometer, said body portion further having three elongated air passage channels equidistantly disposed from the front to the rear portions along its outer periphery, whereby, subsequent to positioning said aerodynamic thermometer mouthpiece about a thermometer at a predetermined location along its length, a user is able to engage said ribbed center portion between the upper and lower teeth to thereby protect the thermometer from breakage, to properly position the thermometer within the mouth cavity, and to minimize breathing impairment due to its tapered, aerodynamic, elongated body construction.

4,502,795

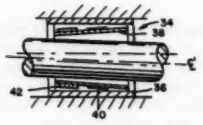
FOIL BEARING ALIGNMENT

Reinhard M. Klaass, Phoenix, and Francis J. Suriano, Scottsdale, both of Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Sep. 30, 1982, Ser. No. 430,429

Int. Cl.³ F16C *32/06*

U.S. Cl. 384—103 **21 Claims**



1. A fluid bearing comprising:

a first member having an axially extending bore therein;

a second member rotatably supported within the axially extending bore of said first member; and

a plurality of overlapping complaint foils mounted within the axially extending bore of said first member around said second member, each of said plurality of foils including along their axial length at least two rows of shims between the foils and the axially extending bore of said first member, at least one row of shims having a thickness differing from the other row of shims to radially outwardly diverge the surface of said plurality of foils along their axial length around said second member.

4,502,796

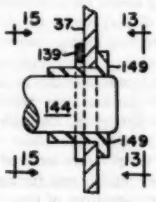
BEARING FOR A ROTATING SHAFT

Robert H. Wilczewski, and James E. Blomquist, both of 203 E. Main, Riverton, Wyo. 82501

Division of Ser. No. 498,678, May 31, 1983, , which is a division of Ser. No. 362,883, Mar. 29, 1982, abandoned, which is a division of Ser. No. 228,995, Jan. 27, 1981, abandoned, which is a division of Ser. No. 38,910, May 14, 1979, Pat. No. 4,257,282. This application Jun. 4, 1984, Ser. No. 616,587

Int. Cl.³ F16C *35/02*

U.S. Cl. 384—439 **3 Claims**



1. A bearing for use in combination with a square slot in a support structure to rotatably mount a shaft for movement relative to said bearing and said support structure, said bearing comprising:

a main body extending along a first axis and having a hole therethrough for rotatably receiving said shaft, said hole extending in a direction substantially parallel to said first axis, said main body further including:

(i) a first section extending in the direction of said first axis and having a square profile when viewed along said first axis, said square profile being dimensioned slightly less than said square slot to slideably fit therethrough with the sides of said square profile and said square slot parallel,

(ii) a second section abutting said first section and extending in the direction of said first axis, said second section having a profile when viewed along said first axis, said profile having at least five sides spaced from each about said first axis with four of said sides being coplanar with the sides of said square profile of said first section, said at least one remaining side of said second section profile extending outwardly of said first axis for a distance less than the corresponding portion of said square profile of said first section extends outwardly of said first axis, said profile of said second section having a first part extending along said first axis from said first section for a first distance and a second part extending therefrom along said first axis for a distance substantially equal to the thickness of said support structure defining said square slots, and,

(iii) a third section abutting said second section and extending in the direction of said first axis, said third section having a profile when viewed along said first axis, said profile having a least one portion thereof extending outwardly of said first axis for a distance greater than any portions of said profiles of the first and second sections and being dimensioned to prevent passage of said third section through said square slot, and,

a retaining member positionable substantially about said first part of said second section and between said first and third sections, said retaining member having at least a position thereof extending outwardly of said first axis when positioned about said second section for a distance greater than said profiles of said first and second sections whereby said first section of said bearing can be passed through said square slot until said end portion of said third section abuts the support structure defining the square slot and said second part of said second section is received in said square slot, said retaining member positioned about said first part of said second section, and said shaft rotatably mounted within the hole of the main body of said bearing for movement relative to said bearing and said support structure.

4,502,797

ARRANGEMENT FOR PRESSING A PRINT HEAD AGAINST A RECORD CARRIER

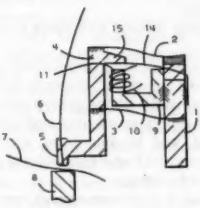
Fritz W. Hilpert, Boeblingen; Erich Kohm, Schoenaich; Volker Rudolph, Aidlingen, and Manfred Wohnsdorf, Boeblingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 20, 1983, Ser. No. 496,760

Claims priority, application European Pat. Off., Jun. 4, 1982, 82104903.8

Int. Cl.³ B41J *3/18*

U.S. Cl. 400—55 **3 Claims**



1. A support for a print head having an electrode that is movable over a record carrier, wherein the improvement comprises:

a first frame piece,

means resiliently connecting the print head to said first frame piece and urging the print head away from the record carrier, said resilient connecting means comprising at least one leaf spring member of magnetizable material and a second spring means,

electromagnetic means supportedly connected to said first frame piece between said one leaf spring member and the record carrier and including at least one pole facing said one leaf spring member whereby activation of said electromagnetic means magnetically attracts said one leaf spring member to permit said second spring means to move said print head into pressing engagement with the record carrier.

4,502,798

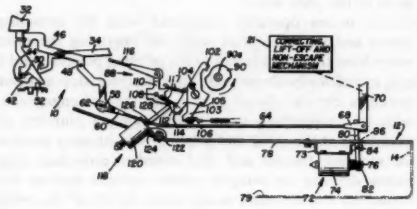
TYPEWRITER BASEPLATE ATTACHMENT ENABLING USE OF PRINT KEYS FOR NON-PRINT OPERATIONS

Lawrence Holmes, Jr., 4 Cambridge Rd., Pompton Lakes, N.J. 07442

Continuation of Ser. No. 457,972, Jan. 14, 1983, abandoned, which is a continuation of Ser. No. 139,335, Apr. 11, 1980, abandoned. This application Feb. 7, 1984, Ser. No. 577,319

Int. Cl.³ B41J *5/30*

U.S. Cl. 400—66 **9 Claims**



1. In a typewriter attachment having reader means for generating electrical signals that identify characters printed by a typewriter which typewriter is of the form that has a plurality of print keys for initiating printing of characters on a paper, escapement means for initiating a spacing operation following printing of a character, backspacing means for initiating backspacing operations, correction means for removing a previously printed character from said paper, and a manually operable correction initiating key which actuates both said backspacing means and said correction means, and wherein operation of said correction means temporarily inactivates said escapement means, the improvement to said typewriter attachment comprising:

a manually operable control signal initiating switch,

means for transmitting a control signal identifying voltage in response to operation of said control signal initiating switch, and

actuator means for actuating said correction means of said typewriter independently of said correction initiating key thereof and independently of said backspacing means thereof in response to concurrent operation of said control signal initiating switch of said attachment and a print key of said typewriter,

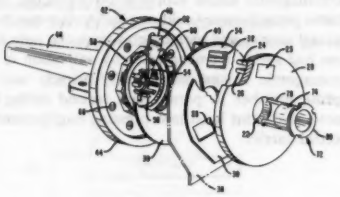
whereby said print keys of said typewriter may be selectively used to initiate non-print control signal generation by said reader means without printing of the characters represented by said print keys on said paper and without spacing operation of said typewriter in either direction.

4,502,799

DOT MATRIX PRINT HEAD

David E. Weeks, Newfield; Robert L. Wirth, and John W. Reece, both of Ithaca, all of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 25, 1983, Ser. No. 470,013
Int. Cl.³ B41J *3/12*
U.S. Cl. 400—124 **14 Claims**



1. A wire matrix print head comprising a housing portion, a

plurality of print wires extending through said housing portion and movable from a non-printing position to a printing position,

means for actuating the print wires from the non-printing to the printing position,

means for supporting the actuating means in position relative to the housing portion to provide an operating arrangement of the print wires,

armature means operably associated with the actuating means and with the print wires for operating the print wires from the non-printing to the printing position, and a

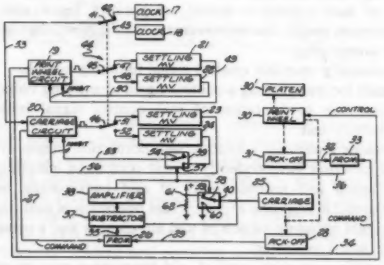
single, cylindrically-shaped, combined fastener-stop member having a circular flange at one end thereof engageable with said supporting means and having a plurality of extensions at the other end gripping said housing portion for securing thereof and said member providing stop means defining an integral planar surface portion for impact by the armature means upon return of the print wires from the printing to the non-printing position.

4,502,800

DAISYWHEEL PRINTER

John W. Jamieson, Alamo; Sen L. Lee, and Suhdok D. Moon, both of Los Altos, all of Calif., assignors to 501 Qume Corporation, San Jose, Calif.

Filed Jul. 8, 1982, Ser. No. 396,243
Int. Cl.³ B41J *1/30*
U.S. Cl. 400—144.2 **6 Claims**



1. A printer comprising:

a platen;

carriage means mounted for movement parallel to said platen along a line comprised of multiple character positions;

a hammer carried by said carriage means selectively actuatable for movement toward said platen;

print wheel means carrying a plurality of fully formed characters;

means mounting said print wheel means on said carriage means for movement with respect to said hammer whereby each of said plurality of characters can be moved into a print position in alignment with said hammer;

carriage control means selectively operable in either a high speed mode for continually moving said carriage means along said line or a lower speed mode for moving said carriage means along said line in steps, stopping at each character position to be printed;

print wheel control means for moving and stopping said print wheel means to move a selected one of said characters into said print position and stop thereat for a defined print wheel settling duration prior to said carriage means arriving at each character position to be printed;

carriage interrupt means operable during said high speed mode for stopping the movement of said carriage means at a character position in the event the selected character for that character position fails to move into and stop at said print position by the time said carriage means arrives at that character position; and

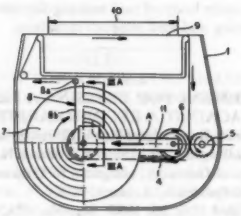
timing circuit means coupled to said print wheel control means for defining intervals of longer and shorter print wheel settling durations associated respectively with said low speed mode and with said high speed mode.

4,502,801

RIBBON CASSETTE FOR WORD PROCESSORS, PRINTERS AND TYPEWRITERS

Kurt Hefti, Zumikon, and Stefan Wirth, Egg, both of Switzerland, assignors to Franz Büttner AG, Egg, Switzerland

Filed Mar. 22, 1983, Ser. No. 477,815
Claims priority, application Switzerland, Mar. 23, 1982, 1787/82
Int. Cl.³ B41J *35/28*
U.S. Cl. 400—208 **8 Claims**



1. A cassette for a film ribbon for a type printing machine in which color is transferred from the film ribbon to a substrate, said cassette comprising:

a generally flat housing formed with guide means defining a printing region;

a carrier received in said housing and formed with a pair of pins fixedly spaced apart for respectively receiving a ribbon supply spool and a ribbon takeup spool, the ribbon passing from said supply spool over said guide means to said takeup spool, said housing being provided with a guide for said carrier for linear translational movement of said carrier in said housing;

a feed wheel received in said housing and rotatable about a fixed axis therein while bearing upon ribbon wound on said takeup spool for progressively advancing ribbon from said supply spool across said region to said takeup spool whereby the diameter of said supply spool progressively

decreases and the diameter of said takeup spool progressively increases;

a spring acting on said carrier to urge said takeup spool toward said wheel;

a brake on said carrier in the form of a spring member bearing axially upon said supply spool for maintaining a drag on said supply spool to apply substantially constant tension to said ribbon at least in said region; and

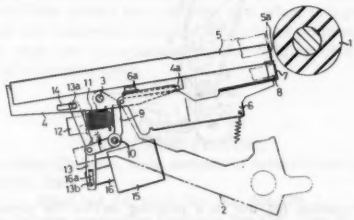
a ramp formed in said housing, said member bearing against said ramp for varying the force of said brake as said carrier shifts in said housing.

4,502,802

PRINTING APPARATUS A CORRECTION RIBBON

Susumu Kuzuya, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jun. 6, 1983, Ser. No. 501,412
Claims priority, application Japan, Jun. 25, 1982, 57-110230
Int. Cl.³ B41J *33/40*
U.S. Cl. 400—212 **3 Claims**



1. A printing apparatus using a printing ribbon and a correction ribbon, said apparatus comprising

a platen;

a carriage which is movable along said platen;

a holder for supporting said printing ribbon and said correction ribbon in normally held respective rest positions and for moving said printing ribbon and said correction ribbon swingably to a print position, said holder being swingably mounted on said carriage;

a first lever having a first end, a second end and an intermediate part, said first lever being pivotally supported about a pivot point at said intermediate part on said carriage so as to be swingable between a normally held first position and a second position;

a first electromagnet disposed in attracting relation to said first end of said first lever for shifting said first lever from said first position to said second position by rotating said first lever about said pivot point, and for holding said first lever at said second position;

a second lever having a first end, a second end, and an intermediate part, said second lever being pivotally supported on said second end of said first lever so as to be swingable between a normally held resting position and a working position, and wherein said second end of said second lever has a closed slot therein;

a second electromagnet having a plunger and a pin holding means thereon, said second electromagnet being disposed to have said pin holding means connected rotatably to said closed slot of said second lever for shifting said second lever from said resting position to said working position and holding said second lever at said working position;

coupling means movably coupling said first end of said second lever to said holder, said coupling means comprising a first pin supported on said second lever, and said holder having formed therein a first slot having cam surface and being shaped to cooperate with said first pin; and

said coupling means operating on said holder for holding said holder positioned at any desired position by movement of said second lever; wherein

to select and move said printing ribbon from said rest position to said print position, said first electromagnet is actuated to said first lever from said first position to said second position so that said holder is caused to swing through said second lever, thereby to move said printing ribbon from its rest position to said print position whereat said coupling acting through said second lever on said holder holds said printing ribbon at said print position; and wherein

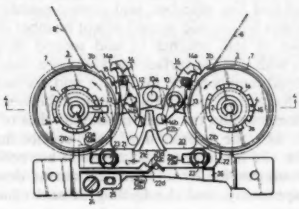
to select and move said correction ribbon from said rest position to said print position, said first electromagnet is actuated to shift said first lever from said first position to said second position and said electromagnet is concurrently actuated to shift said second lever from said resting position to said working position, thereby to move said holder to swingably move said correction ribbon from its rest position to said print position whereat said coupling means acting through said second lever on said holder holds said correction ribbon at said print position.

4,502,803

REVERSIBLE INK RIBBON FEED MECHANISM

Shigenori Hattori, Aichiken, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Feb. 26, 1981, Ser. No. 238,227
Claims priority, application Japan, Feb. 29, 1980, 55-26892[U]
Int. Cl.³ B41J *33/48, 33/514*
U.S. Cl. 400—219.2 **4 Claims**



1. In an ink ribbon feed mechanism for a printing machine of the type comprising a base plate; a pair of spool hubs mounted on said base plate for holding a ribbon spool carrying an ink ribbon, each of said spool hubs having a ratchet wheel coaxially secured thereto to feed the ribbon from one to the other of said spools; a feed device having actuating lever means and a pair of feed pawls pivotally supported on said actuating lever means, each of said pawls associated with a respective one of said ratchet wheels; a pair of springs for biasing said feed pawls causing said feed pawls to engage said ratchet wheels respectively; drive means for reciprocating said actuating lever means in a cycle movement; a reversal device movably mounted on said base plate for movement between a first and a second position, said reversal device causing one of said feed pawls to disengage from said ratchet wheel corresponding thereto for feeding said ribbon from one to the other of said spools in a first direction upon a reciprocal movement of said actuating lever means when said reversal device is located in the first position, and said reversal device causing the other of said feed pawls to disengage from said ratchet wheel corresponding thereto for feeding said ribbon in a second direction opposite to said first direction when said reversal device is located in the second position; a pair of sensing elements for sensing the amount of said ribbon on said spools; connecting means for alternately connecting said sensing elements with said reversal device to move said reversal device from one of the first and second positions to the other upon the sensing movement of said sensing elements, wherein said reversal device comprises:

a first member movably supported by said base plate between the first and second positions and having a recess

forming a pair of shoulders, a pair of notches continuously formed so as not to include a flat surface therebetween and a pair of portions engageable with said connecting means;

a first detent member resiliently engaging with either of said notches of said first member for positioning said first member in the first position or the second position;

a second member movably mounted on said base plate between the first and second positions and having a pair of notches formed so as to include a flat surface therebetween and a projection engageable with said feed pawls to keep either of said feed pawls disengaged from said ratchet wheel corresponding thereto, said projection further having a base portion of which a pair of side edges are engageable with said pair of shoulders of said recess;

a second detent member resiliently engaging with either of said notches of said second member for positioning said second member in the first position or the second position so as to provide for a predetermined distance between each of said edges and each of said shoulders corresponding thereto for allowing relative movement between said first and second members, whereby while said first member is moved by said connecting means from said first position thereof to said second position, said second member is moved with said first member after said first member has been moved by the predetermined distance to cause one of said shoulders to engage with the corresponding side edge of said base portion, so that when said first member if further moved reaches the position where said first detent member disengages from one of the notches of said first member and begins to engage with the other notch of said first member, said second member reaches the position where said second detent member disengages from one of said notches of said second member and engages with said flat surface therebetween, then said first and second members are moved to said second position under a forcefully cooperating operation between the first detent member and the other of said notches of said first member and the operation of said connecting means, thereafter the first and second members are positioned in said second position by said first and second detent members respectively, and the feeding of said ribbon is reversed.

4,502,804

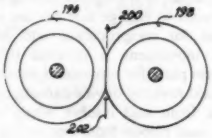
PAPER FEEDING AND GUIDING SYSTEM

Frederick P. Willcox, 565 Oenoke Ridge, New Canaan, Conn. 06840

Continuation-in-part of Ser. No. 422,935, Sep. 24, 1982, abandoned. This application Dec. 22, 1983, Ser. No. 564,219

Int. Cl.³ B41J *13/076, 13/28, 13/10*

U.S. Cl. 400—641 **20 Claims**



1. In a device which employs record material and having means for guiding, supporting, and feeding said material, the improvement comprising:

two cooperating feed rollers of equal outer diameter supported for rotation about respective axes which are normally parallel to each other,

at least three equally compressible rings surrounding each of said rollers and correspondingly spaced therealong, each ring having a face width generally less than ¼ inch (3 mm), and

means for urging said rollers together to compress each of more than two rings along one roller against a corresponding ring disposed along the other roller, each pair of corresponding compressed rings forming a substantially flat appreciable interface therebetween, the flat interface formed by the compressible rings defining a straight line of action sufficient to provide that said record material engaged between the pairs of corresponding compressed rings are fed therethrough along a substantially flat plane.

4,502,805

DEVICE FOR LINE PRINTERS FOR THE DEPOSITING OF SHEET-LIKE DATA CARRIERS

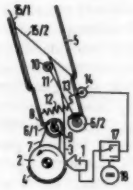
Rolf Humbs, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 8, 1983, Ser. No. 511,919

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1982, 3228620

Int. Cl.³ B41J *11/00*

U.S. Cl. 400—647.1 **5 Claims**



1. Apparatus for use in a printing device for depositing sheet-type recording media transported through a printing area by a platen comprising a deposit tray disposed above said platen and having a deposit area between opposed front and rear longitudinally directed walls against which recording media is stacked one on top of the other, said deposit tray having a lower end adjacent said platen defining an insertion opening, first and second transport rollers adjacent said lower end on opposed sides of said insertion opening, said first transport roller being driven for rotation, said second transport roller being supported by pivot means for selectively drawing said second transport roller across said insertion opening into driving nip relation with said first transport roller, said platen conducting recording media into said insertion opening during the printing thereof and said first and second transport rollers passing recording media fully into said deposit tray by said driving nip relation following the printing thereof, and means for stacking the recording media against either said front or rear walls, the selection of the wall against which the recording media is stacked being determined by the pivoted disposition of said deposit tray, said means comprising fixed bearing means coupled to said deposit tray such that said deposit tray is pivotable on said bearing means about a bearing axis.

4,502,806

GUTTER CLEANING DEVICE

Edward Albertson, 1070 W. Ocean View Ave., Norfolk, Va. 23503

Filed May 6, 1983, Ser. No. 492,230

Int. Cl.³ A47L *13/03;* **E04D** *13/06*

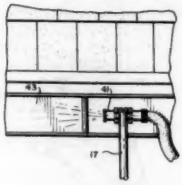
U.S. Cl. 401—137 **10 Claims**

1. A gutter cleaning device for removing debris from gutters on a building for controlling liquid run-off from the roof of the building, comprising:

a generally elbow-shaped connecting member one end of which is adapted to carry gutter cleaning means, and the other end of which is adapted to be connected to an elongate handle member; and

a pair of removably mounted gutter cleaning plates of substantially planar material, a first end portion of each plate is connected to the connecting member such that said pair

of plates are connected back-to-back on each side of the connecting member, and a second end portion of each plate is substantially rectangular in shape, the width of the rectangular portion being not greater than about one half of the width of the bottom of a gutter, said second end portions having bent ends thereof, the ends being bent out



of the plane of the rectangular portion, whereby when said pair of plates are removably mounted in a first position, said bent ends are divergent to permit removal of debris from gutters on a building and when said pair of plates are removably mounted in a second position, said bent ends are convergent to permit holding of a hose member therebetween.

4,502,807

CONNECTING FIXTURE

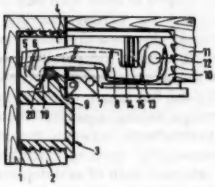
Luciano Salice, Carimate, Italy, assignor to Arturo Salice S.p.A., Novedrate, Italy

Filed Jun. 14, 1983, Ser. No. 504,378

Claims priority, application European Pat. Off., Jun. 16, 1982, 82105287.5

Int. Cl.³ B25G *3/00*

U.S. Cl. 403—11 **9 Claims**



1. A connecting fixture for detachably connecting two plate like furniture parts, abutting preferably at right angles to each other, said connecting fixture comprising:

two fixture elements, each fixture element having a housing adapted to be secured to one of the furniture parts to be connected and one of said two fixtures elements includes two detent levers mounted parallel to each other about a common pivot axis in one of said housings, a detent projection defined by each of said detent levers being hook-shaped and each detent projection including a side face, each side face being spaced a different radial distance from the common pivot axis and the radial distance from each said side face to said pivot axis continuously decreasing toward the root of said side face, a spring mounted in said one housing adapted to bias said two detent levers independently of each other, and the other of said two fixture elements includes a bar defining a supporting edge mounted in the other of said housings, an opening defined by said other housing being adapted to receive said detent projections when the detent levers have been pushed into said other fixture element and one of said detent projections snaps its side face behind said bar and the side face of the snapped in projection lies on the supporting edge at a distance spaced from its root.

4,502,808

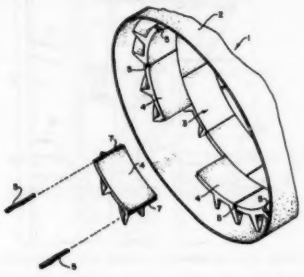
LINER SEGMENTS RETENTION MEANS

Charles J. Didion, St. Charles, and Albert J. Meade, Ballwin, both of Mo., assignors to Didion Manufacturing Company, St. Peters, Mo.

Filed May 17, 1982, Ser. No. 378,984

Int. Cl.³ F16B *3/04*

U.S. Cl. 403—24 **5 Claims**



1. A liner segment retention means for use in holding a pair of adjacent liner segments for a casting shake-out unit affixed together, comprising, a pair of adjacent liner segments for a casting shake-out unit, said unit being of cylindrical design, each segment having a groove formed along adjacent side edges and aligned to form an opening between said adjacent segments, a retention means for holding said segments of the liner in their installed position, to assure tight retention of said segments in place even after prolonged usage would otherwise loosen them with respect to each other, said retention means comprising a length of resilient material insertable into intermediacy between the abuting edges of adjacent segments and into the opening formed therebetween, said length of resilient material being turned from alignment at least at one location to provide for its give and deformation when driven into its retaining position between adjacent segments, and upon wearing of the said segments the resiliency of the said length of material urging itself towards its angulated steady state condition and continuing to tightly bind against the said adjacent segments for maintaining their tight securement together during installation and usage of the casting shake-out unit, said retention means formed of a resilient material comprising a length of rod means, said rod means being formed of a resilient steel, said rod means including a series of slight angular bends providing undulating surface deformation under force to bind and retain the adjacent liner segments into tight installation, whereby said segments comprising sections of modular components forming the inner perforated cylinder of the casting shake-out unit that are rigidly secured together during the units operation.

4,502,809

METHOD AND APPARATUS FOR CONTROLLING THERMAL GROWTH

Carl H. Geary, Greensburg, Pa., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 31, 1981, Ser. No. 297,798

Int. Cl.³ F16D *3/00*

U.S. Cl. 403—28 **4 Claims**

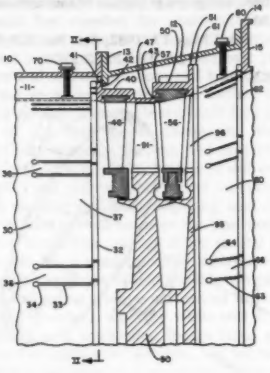
3. Apparatus for controlling differential thermal growth comprising:

a first member;

a second member having a casing with a flange thereon;

a plurality of pairs of proximate sawcuts in said flange and extending into said casing to define a plurality of spring members;

means for securing the flange portions of said springs to said first member whereby differential thermal growth between said first and second members will cause deflections of said spring members.



4,502,810

DEVICE FOR PERPENDICULARLY JOINING FURNITURE PANELS

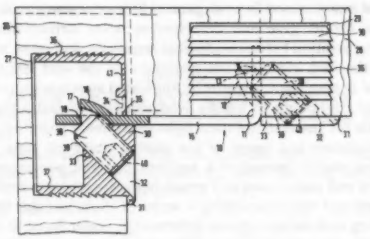
Hans Nock, Rohrdorf, Fed. Rep. of Germany, assignor to Hafele KG, Fed. Rep. of Germany

Filed Sep. 15, 1983, Ser. No. 532,376

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1982, 3236169

Int. Cl.³ F16B *9/02*

U.S. Cl. 403—231 **20 Claims**



1. Device for perpendicularly joining furniture panels, said device comprising in combination a cylindrical housing having a receptacle receiving slot inserted into a blind bore provided in a first furniture panel and mounting means secured on a second furniture panel and adapted to be inserted into said receptacle receiving slot provided in said inserted housing and extending parallel to the center axis of said housing, said mounting means having lateral offsets for engagement with a screw threaded tightening pin adjustable in a threaded hole in said housing, said threaded hole forming an acute angle with said receptacle receiving slot for said mounting means and being accessible from the same side as said receptacle receiving slot, characterized in that said mounting means comprises an angular bracket (**10**) having a short leg (**11**) with protrusion (**12**) extending from one side thereof and forming the edge of an aperture, said leg (**11**) adapted to be inserted into said receptacle receiving slot (**35**) in said housing (**30**), said mounting means tightened by said screw threaded tightening pin (**38**) within said housing and said angular bracket having a long leg (**15**) secured to said second furniture panel.

4,502,811

ADJUSTABLE SUPPORTS FOR CYCLE SADDLES

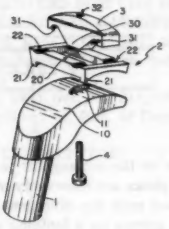
Jean Patriarca, 50 Cours Vitton, Lyon 69006, France

PCT No. PCT/FR81/00174, § 371 Date Feb. 28, 1983, § 102(e) Date Feb. 28, 1983, PCT Pub. No. WO83/02260, PCT Pub. Date Jul. 7, 1983

PCT Filed Dec. 30, 1981, Ser. No. 474,646

Int. Cl.³ B25G *3/36*

U.S. Cl. 403—391 **1 Claim**



1. An adjustable support for supporting on a frame pillar of a cycle a saddle of the type having parallel longitudinally disposed frame wires, the support comprising:

(a) a shoe supported on the pillar and having a convex longitudinally extending upper face comprising transversely extending generatrices, the upper face being bounded by two parallel lateral faces of the shoe, and the shoe having a longitudinally elongated slot extending vertically through its upper face;

(b) a carriage having an upper face having spaced parallel longitudinally extending depressions disposed and shaped to receive said saddle frame wires and having a lower concave face shaped to mate with said convex upper face of the shoe, and the carriage having laterally spaced flanges extending downwardly below said concave face and disposed to overlie the parallel lateral faces of the shoe to align the carriage therewith, the flanges extending longitudinally the full length of the concave lower face, and the carriage having a central rectangular opening extending therethrough between the upper and lower faces, the rectangular opening extending in the lateral direction to intersect both of said depressions;

(c) a head having a base portion shaped to enter said rectangular opening and having clamping portions extending laterally from the head and aligning with said depressions and shaped to engage the saddle frame wires where they cross said rectangular opening, and the head having a central vertically disposed threaded hole extending therethrough; and

(d) a screw extending through said slot in the shoe and engaging said threaded hole to tighten the head and carriage on the saddle frame wires and hold the carriage against the shoe.

4,502,812

ROADWAY BARRIER AND RESTRAINING CAP COMBINATION

Stanley Zucker, 15 Mary Beth Dr., Suffern, N.Y. 10901

Filed Sep. 27, 1982, Ser. No. 423,656

Int. Cl.³ E01F *15/00*

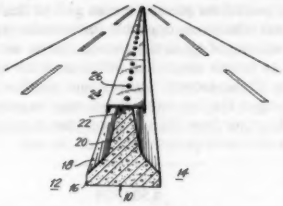
U.S. Cl. 404—6 **11 Claims**

4. Roadway median barrier and restraining cap comprising in combination:

a New Jersey type roadway median barrier including a base portion flared on each side and a barrier portion rising from the base portion to a top of the barrier to define substantially continuous surfaces on each side of the barrier to act, when struck by the wheel of a vehicle veering

from the roadway, to lift the wheel and redirect the vehicle back onto the roadway; and

a restraining cap firmly affixed onto the top of the barrier portion and having hook means extending laterally outward beyond said surfaces at the top of the barrier and then sharply downward to ensure that vehicles striking the flared base portion will be returned to the roadway and do not roll over or vault the barrier.



4,502,813

ASPHALT LAYING MACHINE

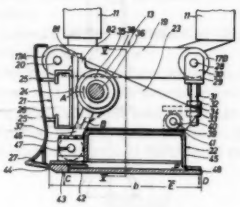
Svend Højberg, Vejen, Denmark, assignor to A/S Phønix, Tagpap og Vejmaterialer, Vejen, Denmark

Filed Dec. 4, 1981, Ser. No. 327,708

Claims priority, application Denmark, Dec. 16, 1980, 5341/80; Feb. 24, 1981, 824/81

Int. Cl.³ E01C *19/38*

U.S. Cl. 404—102 **9 Claims**



1. An asphalt laying machine with a rear body preferably divided into screed sections, each section comprising at least one smoothing and compacting unit comprising a bracket fixedly connected to a carrier frame, an intermediate part connected to said bracket by means of vibration dampers in order to reduce transfer of vibrations to the frame, and a smoothing part having a lower rear edge and a lower front edge located under said intermediate part, said smoothing part a short distance in front of and above its lower rear edge at the rearward point being hinged to said intermediate part for limited rotational movement about this hinge, and said smoothing part at its front edge being hinged to said intermediate part by means of a moving mechanism, which includes at least one upwardly directed connecting rod and an eccentric drive therewith for providing limited elliptical movement of said moving part in relation to a surface to be smoothed, in such a manner that essentially all individual points of the smoothing part relative to an upper carrier frame are reliably moved and guided along elliptical paths having short elliptical axes, whereby these axes are preferably shorter at the rear edge of the smoothing part than at its lower front edge, whereas essentially all individually points of the intermediate part in response to the movement of the smoothing part may be moved either synchronously in phase opposition along corresponding elliptical paths or only forward and backward along a substantially horizontal displacement path.

4,502,814

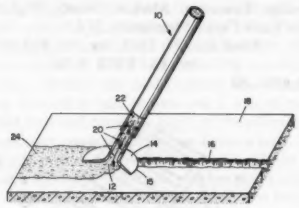
CONTINUOUS CRACK AND JOINT OVERLAY

David C. Trimble, Yorklyn, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 242,085, Mar. 9, 1981, abandoned. This application Dec. 3, 1982, Ser. No. 446,522

Int. Cl.³ E01C *23/02*

U.S. Cl. 404—107 **5 Claims**



1. An apparatus for repairing cracks and depressions in a paved highway surface with a fiber-and asphalt-containing filler material, said apparatus comprising, in combination,

an external reservoir for providing filler material in a flowable state;

outlet means receivably attached to said external reservoir for transmitting said filler material from said external reservoir;

inverted saucer-shaped spreading means circumferentially surrounding and flowably receivably attached to said outlet means for applying said filler material radially outward into and over the edges of said cracks and depressions to fill the same and form an overthrust or overlayment configuration;

whereby essentially random orientation of the fiber of said filler material is retained in passage of said filler material through said spreading means to provide improved shear and crack resistance to the repaired highway surface.

4,502,815

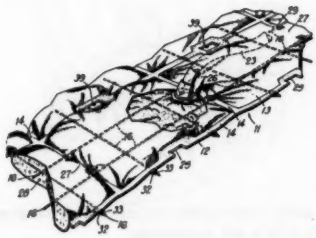
REVETMENT PANEL METHODS

John M. Scales, Norcross, and Bernard F. Wolcott, Roswell, both of Ga., assignors to Nicolon Corporation, Norcross, Ga.

Division of Ser. No. 424,563, Sep. 27, 1982, Pat. No. 4,449,847. This application Feb. 28, 1984, Ser. No. 584,797

Int. Cl.³ E02B *3/12*

U.S. Cl. 405—17 **20 Claims**



1. A method of producing a web comprising the steps of:

(a) weaving, with two fabric layers, a web by weaving the fabric layers separately to form a plurality of rows and columns of compartments, interweaving the fabric layers to form selvage separating said compartments, and weaving the fabric layers separately to form a plurality of slots in the selvage, each of the slots communicating with one or more of the compartments; and

(b) inserting, for each row and column of the compartments, at least one cable through at least one of the slots in such a manner that the compartments are longitudinally and transversely interconnected by the cables.

4,502,816

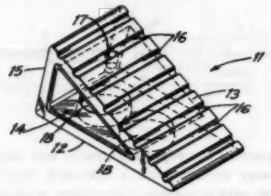
SHORELINE BREAKWATER

Frank E. Creter, Jr., Calverton, N.Y., and Richard E. Creter, Oldbridge Township, Mercer County, N.J., assignors to Creter Vault Corp., Flemington, N.J.

Filed Jun. 27, 1983, Ser. No. 508,327

Int. Cl.³ E02B 3/04

U.S. Cl. 405—30 **9 Claims**



1. A concrete module for a shoreline breakwater adapted for placement in the surf zone comprising a triangular prismatic shape having three major parallelogram faces, a long face to be the foot, a face forming an acute angle with said foot so as to form in use a gently sloping seaward face, and a beachward face forming with said foot an included angle less than 90°, with the sides of said prism being substantially triangular, said seaward face having a plurality of transverse parallel grooves indented therein, whereby wave energy is dissipated as waves run up said seaward face, said grooves being shaped such that sand-like solid material carried up said seaward face by wave action will slide down said seaward face.

4,502,817

AIR INLET VALVE FOR UNDERWATER DIVER'S DRY SUIT

Richard W. Long, and Robert T. Stinton, both of San Diego, Calif., assignors to Diving Unlimited International, Inc., San Diego, Calif.

Filed Apr. 28, 1982, Ser. No. 372,626

Int. Cl.³ B63C 11/08

U.S. Cl. 405—186 **6 Claims**

1. A safety valve system for controlled inflation and deflation of a diver's suit, comprising:

a suit which provides a sealed interior when worn by a diver;

first manually actuable valve means connected to the interior of the suit and selectively openable for exhausting air completely out of the suit at a first predetermined rate;

a source of compressed air at a predetermined pressure;

an air line connected at one end to the source of compressed air;

restricting means having one end connected to the other end of the air line for limiting the flow of air therethrough to a second predetermined rate which is less than the first predetermined rate;

plenum means connected at one end to the other end of the restricting means for storing a pressurized volume of air sufficient to provide substantial inflation of the suit; and

second manually actuable valve means connected to the other end of the plenum means and to the interior of the suit and selectively openable for introducing the pressurized volume of air in the plenum means into the suit in a burst to permit controlled inflation of the suit;

whereby if the second valve means malfunctions and remains open the first valve means may be manually opened to exhaust air from the suit faster than it can be introduced to prevent over-pressurization of the suit.

4,502,818

ROOF SUPPORT PIN

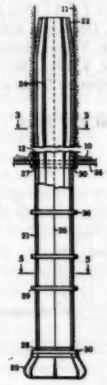
Gerald W. Elders, 38 Yakashba Estates, Prescott, Ariz. 86301

Continuation of Ser. No. 134,939, Mar. 28, 1980, abandoned. This application May 24, 1982, Ser. No. 381,313

The portion of the term of this patent subsequent to Sep. 21, 1999, has been disclaimed.

Int. Cl.³ E21D 21/00

U.S. Cl. 405—259 **2 Claims**



1. A roof support pin for insertion into a roof bore, the bore having an opening comprising:

(a) an elongate tube for insertion into the bore, the tube being expandable within the bore for frictionally engaging the bore, and

(b) means adjacent to the bore opening engaging the tube for allowing the tube to expand within the bore a distance from the bore opening whereby the tube does not engage the bore immediately adjacent to the bore opening.

4,502,819

CONSTANT DISCHARGE DEVICE IN A CONVEYOR FOR POWDERY AND GRANULAR MATERIALS

Shuzo Fujii; Koichi Abe, and Hideo Miwa, all of Tokyo, Japan, assignors to Denka Engineering Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1982, Ser. No. 388,304

Int. Cl.³ B65G 53/40, 53/66

U.S. Cl. 406—14 **4 Claims**

1. A constant discharge device in a pneumatic conveyor for discharging a powdery or granular material, comprising:

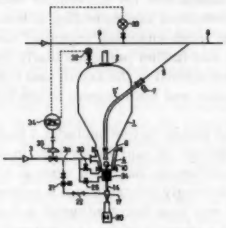
a pressure tank for storing the powdery or granular material, said pressure tank having a fluidizing apparatus for fluidizing the material;

a conveyor pipe penetrating said tank;

a discharge nozzle disposed in said pressure tank adjacent to said fluidizing apparatus and adapted to be connected to the conveyor pipe, said discharge nozzle having an open end;

a discharge regulator valve disposed in said pressure tank in confronting relation to said open end of said discharge nozzle and having an outlet in an end thereof facing said discharge nozzle for ejecting a stream of air therethrough;

a driver for adjusting said discharge regulator valve positionally with respect to said open end of said discharge nozzle, whereby the amount of the material as discharged through said discharge nozzle into the conveyor pipe can be controllably adjusted by adjusting the position of said



discharge regulator valve with respect to said open end of said discharge nozzle and also by adjusting the amount of the stream of air ejected through said outlet in said discharge regulator valve;

a booster pipe coupled to said conveyor pipe;

a first pressure sensor for detecting the pressure in said booster pipe;

a second pressure sensor for detecting the pressure in said pressure tank; and

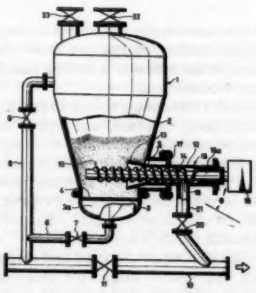
a differential pressure regulator controlled by signals supplied from said first and second pressure sensors, said fluidizing apparatus and said discharge regulator valve being supplied with air under pressure, the rate of flow of which is controlled by said differential pressure regulator.

4,502,820

HIGH-PRESSURE CONVEYOR FOR POWDERY AND GRANULAR MATERIALS

Shuzo Fujii; Hideo Oishe, and Takashi Moriyama, all of Tokyo, Japan, assignors to Denka Engineering Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1982, Ser. No. 408,303
Int. Cl.³ B65G *53/48*
U.S. Cl. 406—56 **1 Claim**



1. A conveyor for conveying a powdery or granular material on a gas at a high pressure of 2 Kg/cm²G or higher, comprising:

a pressurization tank having an aerator for storing the powdery or granular material therein;

a plurality of discharge units each connected to said pressurization tank for directly distributing said material to different locations, each of said discharge units including a guide cylinder mounted on said pressurization tank and having a discharge port outside said tank and a flaring end projecting into said tank for introducing the material into said guide cylinder, and a screw feeder having a longitudinally extending intermediate portion coaxially disposed in said guide cylinder, a first end extending out of one end of said guide cylinder into said pressurization tank in overhanging relation to said aerator and a second end remote from said first end projecting out of the other end of said guide cylinder, each of said screw feeders including a first spiral blade portion on the upstream side of said discharge port and a second spiral blade portion the winding direction of which is opposite to that of said first blade portion on the downstream side of said discharge port;

a variable-speed drive unit coupled to said second end of each of said screw feeders for rotating the latter;

a conveyor pipe connected to each discharge port for conveying the material supplied from each discharge unit on the gas supplied to each conveyor pipe; and

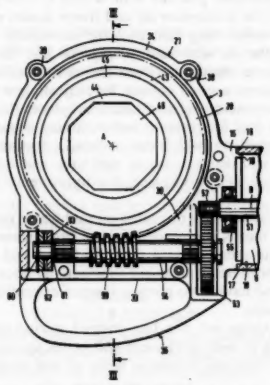
piping means connected to said tank and each of said conveyor pipes for supplying the gas into said tank above and below said aerator to fluidize the material under said high pressure and for supplying the gas into each of said conveyor pipes.

4,502,821

THREAD CUTTING TOOL

Rudolf Wagner, Stuttgart, Fed. Rep. of Germany, assignor to Rems-Werk Christian Föll und Söhne GmbH & Co., Waiblingen, Fed. Rep. of Germany

Filed Aug. 24, 1983, Ser. No. 526,136
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1982, 3231538; Dec. 11, 1982, 3245874
Int. Cl.³ B23G *1/24, 5/00*
U.S. Cl. 408—124 **27 Claims**



1. A thread cutting tool, which comprises:

a housing;

an electric motor which is positioned in said housing and has a speed of greater than approximately 25,000 rpm;

a head ring which is connected to said housing;

a holder ring which is rotatably mounted in said head ring, and which is provided with a worm-gear toothed configuration on its periphery having a modulus represented by the ratio of a spacing distance (t) divided by π, said spac-

ing distance being defined as the distance between adjacent, similarly-directed sides of adjacent teeth of said worm gear toothed configuration and located along a partial circle defined as the sum of said spacing distances between said teeth, said partial circle lying on a circle having a circumference equalling the sum of said spacing distances times the number of said teeth (z), said modulus amounting to less than approximately 1.6 mm; and

at least one worm gearing means operatively connected with said electric motor and with said holder ring for driving the latter, said worm gearing means including at least one worm gear, each of which meshes with said worm-gear toothed configuration of said holder ring.

4,502,822

MACHINE FOR THE PRECISION WORKING OF TOOTH SURFACES OF TOOTHED WORKPIECES

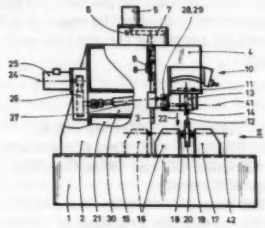
Heinrich Fischer, Munich, Fed. Rep. of Germany, assignor to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany

Continuation of Ser. No. 129,769, Mar. 12, 1980, abandoned. This application Feb. 17, 1983, Ser. No. 467,425

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1979, 2912545; Jul. 11, 1979, 2927976

Int. Cl.³ B23F *19/06*

U.S. Cl. 409—32 **4 Claims**



1. In a machine for the automated precision working of tooth surfaces on toothed workpieces, comprising frame means, a rotatingly drivable gearlike tool which is arranged substantially above the workpiece on said frame means and including first means supporting said tool for movement into a tooth engaging relation with said workpiece and for effecting a center distance change between the centers of said tool and said workpiece, second means for adjusting a crossed-axes angle between said tool and said workpiece, third means for driving said tool for rotation and including a stationary drive motor mounted on said frame means, a transmission means connecting said drive motor to said tool, and a fourth means for supporting said workpiece, the improvement comprising wherein:

(a) said first means is provided on said frame means and said second means is provided on said first means for facilitating adjustment of said tool, said first and said second means both being arranged substantially above said workpiece and having no portion thereof extending below said workpiece;

whereby chips and the like formed during an automated working of said workpiece will be incapable of jamming and/or creating excessive wear of said first and second means;

(b) said frame means consists of a base and a vertical column which is arranged at one end of said base and is fixedly connected thereto, said fourth means consists of a longitudinal guideway which extends from said vertical column to the other end of said base on said base for directly receiving a pair of chucking devices for said workpiece thereon and on axially opposite sides thereof, said chucking devices being adjustable in a horizontal direction along said guideway and can be fixedly oriented on said guideway, said chucking devices supporting said workpiece for rotation and while simultaneously maintaining said workpiece axially stationary, and the axis of rotation of said workpiece, when supported on said chucking devices, extends parallel to said guideway and interacts said vertical column;

(c) said first means includes a vertically movable vertical carriage supported on said vertical column;

(d) said vertical carriage is mounted on a side of said column facing the other end of said base;

(e) said second means includes a horizontally divided adjusting carriage which is mounted on the underside of the said vertical carriage, which adjusting carriage consists of an upper part which is secured to said vertical carriage and a lower part which is pivotally mounted through a rotary clamping mechanism for movement about a horizontal axis, said horizontal axis extending at least approximately through the tooth engaging region of said tool and said workpiece, and further perpendicularly both with respect to a common normal to the axis of said tool and the axis of said workpiece and with respect to the axis of said workpiece; and

(f) said second means further includes a tool head mounted on the underside of said lower part in a further rotary clamping mechanism having a vertical pivot axis and in which the drivingly rotatable tool is supported, the axis of rotation of said tool being adjusted in a selectable angle (ϕ) to effect a crossing of the axis between said workpiece and said tool and can be secured on said adjusting carriage.

4,502,823

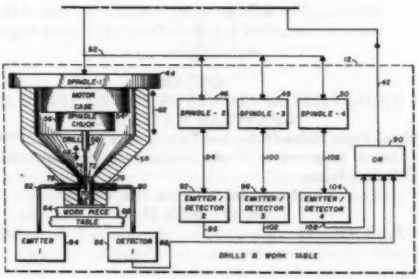
BROKEN DRILL BIT DETECTOR

Steve Wronski, Shoreview; John E. Albright, St. Paul, both of Minn., and Jeffrey J. Carlson, Las Cruces, N. Mex., assignors to Sperry Corporation, New York, N.Y.

Filed Dec. 21, 1981, Ser. No. 332,581

Int. Cl.³ B23C *9/00;* **H01J** *5/16;* **B23B** *47/24*

U.S. Cl. 409—134 **6 Claims**



1. For use in a numerically controlled drilling machine having control apparatus for positioning a work piece to be drilled and controlling the actuation of a drilling function in cycles, a drill bit detector comprising:

emitter means for directing a source of energy in the vicinity of a drill bit to be detected, said emitter means including signal source means for providing drive signals at a predetermined frequency, and light emitting means coupled to said signal source means for emitting pulses of light energy, said pulses occurring with a frequency substantially equivalent to said predetermined frequency of said drive signals toward the drill bit;

detector means oppositely disposed and responsively associated with said emitter means for receiving first energy level signals when the drill bit to be detected is present and second energy level signals when said drill bit is

absent, wherein said detector means includes energy detecting circuit means for providing said second energy level signals at the frequency of emitted ones of said pulses of light energy when the drill bit is missing;

control circuit means coupled to said detector means for providing disable signals in response to said second level energy signals for disabling the control apparatus of said numerically controlled drilling machine for stopping operation immediately upon detection of the absent drill bit, said control circuit means including frequency responsive means for providing said disable signals in response to said second energy level signals from said detector means and for providing enabling signal in response to said first energy level signals, wherein said frequency responsive means includes phase lock loop means responsive to signals at an amplitude sufficient to be detected and occurring at said frequency for locking on and switching it output to provide said disable signals and tuning means for tuning said phase lock loop means to be responsive to signals detected by said detector means at said predetermined frequency; and

timer means coupled to said frequency responsive means and responsive to said disable signals for passing said disable signal to the numerically controlled drilling machine control apparatus when said disable signal continuously occur for a predetermined threshold time interval, whereby said disable signals occurring for less than said threshold time are ignored as spurious and the operation of the numerically controlled drilling machine is not interrupted.

4,502,824

TOOL CHUCK

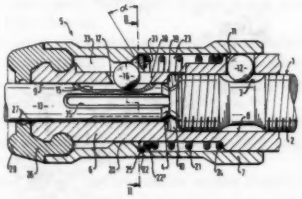
Hans-Peter Dohse, Grafenau, and Karl Wanner, Leinfelder, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 263,463, May 13, 1981, abandoned, which is a continuation-in-part of Ser. No. 971,372, Dec. 20, 1978, abandoned. This application Jun. 29, 1982, Ser. No. 393,369

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1978, 2811328

Int. Cl.³ B23C *9/00*; B23B *31/22*; E02D *7/02*

U.S. Cl. 409—234 **20 Claims**



1. A tool chuck for rotary and percussion tool machines, preferably a drill, comprising a coupling inner sleeve having one end connected to a driven member of the tool machine and another end receiving a tool shank, said inner sleeve having a central axis and being formed with a radial opening, said tool shank being formed with an axially extending recess; an outer sleeve concentrically surrounding said inner sleeve and defining an annular clearance with the same; a single ball engaged in said recess and extended into said radial opening so that it is axially displaceable in said recess and axially and radially displaceable in said radial opening; a sheet-like ring surrounding said inner sleeve; and spring means for loading said sheet-like ring in the direction of said ball and positioned in said annular clearance, said outer sleeve being provided with a means which at least partially axially overlaps said radial opening in the region thereof, which faces away from the tool machine, when said tool shank is received by said another end of the inner sleeve, so that said ball is held between said means and said inner sleeve and its radial displacement in said radial opening is prevented, said sheet-like ring being formed with an inner bore having a diameter and also having a projecting portion of reduced diameter near said inner bore, said portion of said sheet-like ring being engageable with said ball.

4,502,825

MULTI-HEADED SCREW

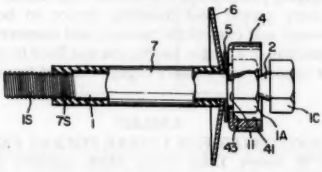
Yukihiko Yamada, Yamato, Japan, assignor to Kyodo Electric Co., Ltd., Tokyo, Japan

Filed Feb. 1, 1982, Ser. No. 344,649

Claims priority, application Japan, Mar. 30, 1981, 56-45015[U]

Int. Cl.³ F16B *31/00*

U.S. Cl. 411—5 **9 Claims**



1. A fastener arrangement comprising:

a threaded screw member having a plurality of heads disposed in a longitudinal direction of the threaded member, each of said plurality of heads being interconnected with its adjacent head by a neck portion, said neck portion being so thin as to be sheared when a tightening torque is applied thereto which exceeds a predetermined value;

a cap member engaged with said threaded member, said cap member including an upwardly opening annular portion surrounding side surfaces of at least the innermost one of the plurality of heads, and a flange portion that extends inboardly with respect to the longitudinal direction of said threaded member, beneath a portion of the said innermost head;

said annular portion having an inner peripheral surface defining, with the said innermost head side surfaces, the shape of a space between the said side surfaces of the head and said inner peripheral surface, said annular portion including a protuberance extending inwardly from the inner peripheral surface thereof engaging with a surface defining a complementary depression in a driving portion of a driving tool, whereby said space has a lateral cross section which is of such a shape as to prevent said driving portion of said driving tool applicable to said inner head, when received into the space, from rotating with respect thereto.

4,502,826

TOGGLE FASTENER

Jean-Claude Fafard, Montreal, Canada, assignor to Centre de Recherche Industrielle du Quebec, Quebec, Canada

Filed May 16, 1983, Ser. No. 494,885

Int. Cl.³ F16B *13/04*

U.S. Cl. 411—340 **14 Claims**

1. A device for fastening objects to thin or hollow walls having a constricted passage comprising, in combination:

a bolt having a threaded shank and a head at one end thereof;

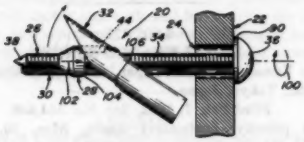
a nut threadedly mounted on said shank; said nut having an aperture therethrough;

a guide blade mounted lengthwise of said shank and extending through the aperture of said nut; said guide blade restraining said nut from rotation with said bolt when

rotated whereby said nut is threadedly displaced longitudinally along said shank;

a bascule having a central opening receiving said shank and said guide blade therethrough; and

means cooperating with said bascule and said nut for causing pivotal movement of said bascule on and relative to said



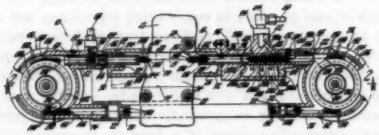
shank when said nut is threadedly displaced along said shank whereby said bascule is pivotable in a first wall-engaging position and in a second longitudinal position to thereby permit said fastening device to be removed through said constricted passage; said cooperating means consisting of a tongue having one end fixed to said nut and the opposite end slidably engaged in said bascule.

4,502,827

TRANSPORTER FOR LINEAR POCKET FEEDER

Everett W. Shows, Lake Orion, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1983, Ser. No. 519,026
Int. Cl.³ F23D *1/00*
U.S. Cl. 414—217 **3 Claims**



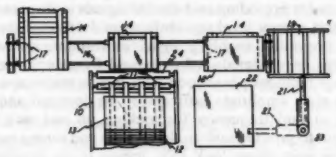
1. In a linear pocket feeder for transporting powder from a reservoir at a low pressure to a supply duct at a relatively higher pressure including a sleeve means having an open end in said reservoir and a discharge port to said supply duct, a drive pulley on one side of said sleeve means, and an idler pulley on the opposite side of said sleeve means, a transporter comprising, a flexible core defining an endless loop, a plurality of annular elastomeric spacer rings stretched over said core and resiliently gripping the latter at predetermined intervals around said loop, a plurality of annular primary discs each loosely received on said core between respective pairs of said spacer rings such that each of said spacer rings is longitudinally compressed against each adjacent primary disc, said spacer rings and said primary discs cooperating in defining a plurality of transport annuli on said core having inboard pressure seals at the interfaces between said spacer rings and said primary discs, said endless loop core with said spacer rings and said primary discs thereon being looped around said drive and said idler pulleys with a linear portion extending through said sleeve means, means on said drive pulley operative to sequentially engage each of said primary discs on the portion of said core looped therearound and to carry each of said engaged primary discs therewith during rotation thereof whereby tension is applied to said core through said spacer rings and said transport annuli are continuously pulled through said sleeve means, and a plurality of secondary disc means substituted for a corresponding plurality of said primary discs at uniform intervals around said endless loop not exceeding the linear distance between said open end and said discharge port of said sleeve means, said secondary disc means slidably sealing against said sleeve means to provide an outboard pressure seal between said open end and said discharge port of said sleeve means.

4,502,828

AUTOMATED SHEET-MOVING SYSTEM

Walter J. Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Continuation of Ser. No. 270,921, Jun. 5, 1981, abandoned. This application Sep. 27, 1983, Ser. No. 536,360
Int. Cl.³ B65H *1/26*
U.S. Cl. 414—226 **10 Claims**



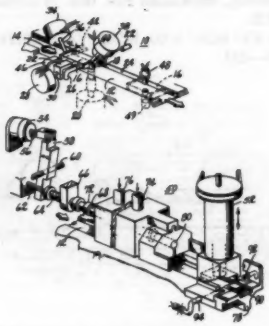
1. An automated system for moving a stack of sheets between a printing press and a sheet bindery, comprising a tray having a floor portion extending throughout the base of said stack of sheets for receiving and fully upwardly supporting said stack of sheets, a support for receiving said tray with the stack of sheets, a sheet feeder for the bindery, a movable robot of the automatic operating type, said robot having an engager for engaging said tray and removing said tray from said support and onto said sheet feeder, and a movable ejector included on said robot for removing said stack of sheets from said tray while said engager is engaged with said tray.

4,502,829

ELECTRONIC COMPONENT SENSING SYSTEM

Paul L. St. Cyr, Middleton, Mass., assignor to USM Corporation, Farmington, Conn.

Filed Apr. 1, 1983, Ser. No. 479,121
Int. Cl.³ B25J *15/02*; B23P *19/00*
U.S. Cl. 414—730 **14 Claims**



1. A system for sensing and responding to the size of an electronic component being processed within a machine which ultimately places the electronic component on a media such as a printed circuit board, said system comprising:

means for temporarily stopping the electronic component at a first sensing station within said machine;

first sensing means for detecting when the electronic component is thus stopped;

means, responsive to said first sensing means, for positioning the electronic component within said first station;

means for sensing the length of the positioned chip within said first station;

means for defining a position of the chip within a second station in said machine in response to the length sensed by said length sensing means; and

means for transporting the chip to the predefined position at the second station within said machine.

4,502,830

INDUSTRIAL ROBOT

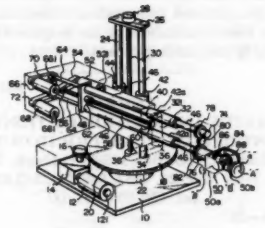
Hajimu Inaba; Seiichiro Nakashima, both of Hino; Shigemi Inagaki, Musashino, and Susumu Ito, Hino, all of Japan, assignors to Fujitsu Fanuc Limited, Tokyo, Japan

Filed Sep. 21, 1981, Ser. No. 304,267

Claims priority, application Japan, Sep. 30, 1980, 55-135259

Int. Cl.³ B25J *9/00*

U.S. Cl. 414—735 **2 Claims**



1. An industrial robot comprising a trunk means mounted for vertical and rotational movement on a stationary base;

a pair of slide sleeves fixed on said trunk means;

first and second arm members mounted within said slide sleeves for rotational and translational movement therein, the outer ends of said arm members being extensible from and retractable into a side of said trunk means through said slide sleeves;

a robot wrist mechanism attached to said outer ends of said arm members, said robot wrist being rotatable about a first axis and swingable about a second axis perpendicular to said first axis;

a mounting compartment positioned on said trunk means at a side opposite to the side from which said arm means extend;

first and second electric motor means fixedly mounted on said trunk means within said mounting compartment;

first and second ball spline shafts driven, respectively, by said first and second electric motor means and connected, respectively, with said first and second arm members for imparting rotational movement thereto;

mechanical reduction means comprising a pair of harmonic drives connected between said first and second arm members and said robot wrist mechanism for converting said rotational movement of said first and second arm members into rotational and swinging motion of said robot wrist mechanism at predetermined reduction ratios, respectively; and

third electric motor means fixedly mounted on said trunk means within said mounting compartment, said third electric motor means being connected through ball screw shaft means to both of said arm members for imparting reversible translatory motion thereto.

4,502,831

METHOD OF CONTROLLING OPERATION OF MULTISTAGE HYDRAULIC MACHINES

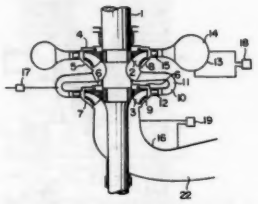
Shinsaku Sato, Ebina, and Ichiro Yamagata, Yokohama, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa, Japan

Filed Jan. 10, 1983, Ser. No. 456,974

Claims priority, application Japan, Jan. 14, 1982, 57-4398; Jan. 14, 1982, 57-4399; Feb. 10, 1982, 57-20158; Feb. 15, 1982, 57-22384; Feb. 15, 1982, 57-22385

Int. Cl.³ F01D *17/00, 17/04, 17/06, 17/08*

U.S. Cl. 415—1 **22 Claims**



1. A method of controlling operation of a multistage hydraulic machine in load adjustment under a steady operation condition thereof in which respective pressure stages are connected in series through runners and return passages and highest and lowest pressure stages are provided at inlet portions thereof with movable guide vanes, a degree of openings of which are variable, said method comprising the steps of controlling the degree of opening of the movable guide vanes of one of said highest and lowest pressure stages in accordance with predetermined control instructions and controlling the degree of opening of the movable guide vanes of the other one of said highest and lowest pressure stages in accordance with control instructions comprising at least one of a hydraulic pressure ratio of a hydraulic pressure at a portion on an inlet side of said highest and lowest pressure stage to a hydraulic pressure at a portion between said highest and lowest pressure stages, a hydraulic pressure difference between a hydraulic pressure at a portion on an inlet side of said highest pressure stage and a hydraulic pressure at a portion between said highest and lowest pressure stages, and a hydraulic pressure difference between a hydraulic pressure at a portion on an outlet side of said lowest pressure stage and a hydraulic pressure at a portion between said highest and lowest pressure stages.

4,502,832

TURBO-MOLECULAR PUMP

Willi Becker, Braunfels, Fed. Rep. of Germany, assignor to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH, Asslar, Fed. Rep. of Germany

Filed Feb. 10, 1983, Ser. No. 465,564

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1982, 3204750

Int. Cl.³ F04D *29/04*

U.S. Cl. 415—10 **11 Claims**

1. A magnetically supported turbomolecular pump assembly, comprising:

a housing;

a rotor and a stator arranged in cooperative relationship with each other in said housing;

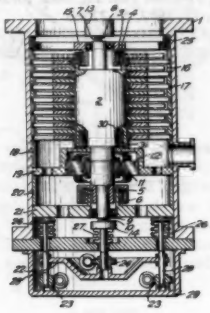
magnetic radial bearing means consisting of magnetic radial bearings which are stable in the radial direction and unstable in the axial direction interposed between said rotor and said stator for mounting said rotor;

holding means for mounting said magnetic radial bearing means on said stator, said holding means and said stator being structured as parts of a single structured unit which

is mounted to be movable in the axial direction within said housing;

mechanical axial bearing means including a first axial bearing which is arranged firmly in said housing and a second axial bearing, said mechanical axial bearing means operating to absorb axial stresses generated by said rotor;

force measuring means for measuring the stresses developed by said rotor in said mechanical axial bearing means; and



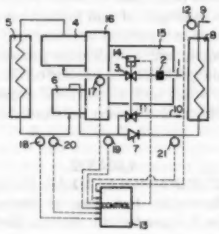
control gear means responsive to said force measuring means for effecting adjustable vertical movement of said structural unit relative to said housing and adjustment of said second mechanical thrust bearing relative to said structural unit to compensate for the axial forces generated by said rotor.

4,502,833

MONITORING SYSTEM FOR SCREW COMPRESSOR

Yozo Hibino, and Sakae Yamada, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 15, 1982, Ser. No. 434,554
Claims priority, application Japan, Oct. 21, 1981, 56-167191
Int. Cl.³ F04D *49/00*
U.S. Cl. 415—17 **14 Claims**



1. A monitoring system for checking the operating conditions of a compressor system including a screw compressor means having an inlet and an outlet, a suction means having an upstream and downstream end connected to said inlet of said screw compressor means, an air discharge means having a downstream end and an upstream end connected to said outlet of said screw compressor means, an air releasing means having a downstream end and an upstream end connected to said air discharge duct at a location between said upstream and downstream airs of said air discharge means, a suction throttle valve provided in said suction means, an air discharge valve means for actuating said suction throttle valve and said air discharge valve to move them between an on-load condition in which said suction throttle valve is open and said air discharge valve is closed and an unloaded condition in which said suction throttle valve is substantially closed and said air discharge valve is open, discharge pressure sensing means associated with said air discharge means for sensing the discharge pressure of said screw compressor means and for generating a signal representative of the sensed discharge pressure, and volume control means means operative in response to the signal from said discharge pressure sensing means for controlling the operation of said actuating means to generate an on-load operating signal when said suction throttle valve and said air discharge valve are moved into said on-load condition and an unloaded operating signal when said suction throttle valve and said air discharge valve are moved into said unloaded condition, said monitoring system comprising:

suction pressure sensor means associated with said suction means for sensing the suction pressure of the screw compressor and for generating an output signal of the sensed pressure;

a temperature sensor means associated with said discharge means for sensing the temperature of compressed air passing through said air discharge means;

diagnosing and judging means operative in response to said on-load and unloaded operating signals from said volume control means for respectively judging the operating conditions of components of the screw compressor under the on-load and unloaded condition by comparing the values respectively sensed by said suction pressure sensor means and said temperature sensor means with respect to preset pressure and temperature values; and

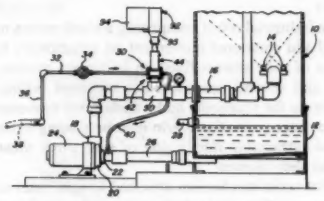
indicating means for indicating the judgment passed by said diagnosing and judging means.

4,502,834

APPARATUS AND METHOD OF THROTTLING CENTRIFUGAL PUMP LIQUID OUTPUT

Samuel G. Jackson, P.O. Box 16587, Lubbock, Tex. 79490

Filed Mar. 29, 1982, Ser. No. 363,022
Int. Cl.³ F04B *17/00*
U.S. Cl. 415—26 **7 Claims**



1. In a water supply system including a centrifugal pump having a pump inlet for receiving a supply of liquid and a pump outlet for discharging liquid to a point of use, and liquid demand sensing control means responsive to increases and decreases in demand for liquid at the point of use, an improved flow control valve for controlling a supply of pressurized gas to the pump inlet to vary the liquid discharge from the pump, comprising:

a valve body having an inlet passage connected to a source of pressurized gas and an outlet passage connected to the pump inlet;

the valve body having a shuttle cavity located between and in communication with the inlet and outlet passages;

a valve seat in the shuttle cavity having an aperture therethrough through which gas from the inlet passage must flow to reach the outlet passage;

a valve shuttle reciprocally mounted in the shuttle cavity adjacent the seat, the shuttle being movable between a lower position in contact with the seat and blocking the flow of gas from the inlet passage, to an upper position allowing gas to flow around the shuttle and through the aperture; and

a diaphragm mounted to a lower side of the valve body

below the seat, having a lower side exposed to liquid pressure downstream of the pump outlet for movement in response to the liquid pressure, the upper side of the diaphragm engaging a lower end of the shuttle to apply an upward force to move the shuttle in response to movement of the diaphragm to increase air flow through the seat in response to an increase in liquid discharge pressure, the diaphragm separating the shuttle from any direct exposure to liquid;

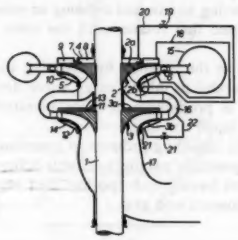
the sensing control means engaging an upper end of the shuttle to apply a downward force to the shuttle axially opposite the upward force of the diaphragm in response to changes in demand for liquid at the point of use, to thereby vary the amount of air admitted through the seat and the amount of liquid discharged from the pump.

4,502,835

MULTISTAGE HYDRAULIC MACHINE

Ichiro Yamagata, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 10, 1982, Ser. No. 416,630
Claims priority, application Japan, Sep. 14, 1981, 56-143778
Int. Cl.³ F03B *3/10*
U.S. Cl. 415—104 **2 Claims**



1. A multistage hydraulic machine comprising:

a housing;

a main shaft mounted in said housing;

a high-pressure stage runner and low-pressure stage runner firmly secured to said main shaft, wherein said housing has formed therein:

a plurality of runner chambers enclosing each of said runners, respectively, of said high-pressure stage and said low-pressure stage,

return passage means communicating with said runner chambers of said high-pressure stage and low-pressure stage,

a high-pressure stage, outer back chamber, a high-pressure stage, inner back chamber and a high-pressure stage, side chamber all of which are located within said runner chamber enclosing said high-pressure stage runner,

a low-pressure stage, side pressure chamber located within said runner chamber enclosing said low-pressure stage runner;

means for communicating said high-pressure stage inner back chamber with said return passage means; and

means for respectively communicating said low-pressure stage side pressure chamber with said return passage means;

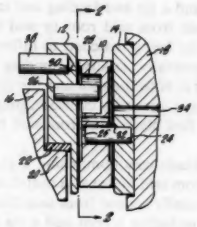
wherein said means for communicating said high-pressure stage inner back chamber with said return passage means further comprises balancing valve means.

4,502,836

METHOD FOR NOZZLE CLAMPING FORCE CONTROL

Judson S. Swearingen, 27403 Pacific Coast Hwy., Malibu, Calif. 90265

Continuation-in-part of Ser. No. 394,692, Jul. 2, 1982, abandoned. This application Sep. 30, 1982, Ser. No. 430,349
Int. Cl.³ F01D *17/16*
U.S. Cl. 415—150 **22 Claims**



1. A method for controlling clamping forces in a variable primary nozzle system of a radial turbine having primary nozzles formed by pivotal nozzle vanes clamped between mounting rings having relative axial movement therebetween, comprising the steps of:

sensing the force required to vary the primary nozzles;

opening a source of pressure when said sensed force exceeds a preselected value;

directing flow from the opened source of pressure to the nozzle vanes adjacent the mounting rings.

6. A nozzle clamping force control for a variable primary nozzle system on a radial turbine having mounting rings mounted for relative axial movement therebetween, nozzle vanes clamped between the mounting rings, and an actuator for pivoting said nozzle vanes, comprising

cavities in the nozzle vane surfaces adjacent the rings;

passages extending to said cavities;

a source of pressure in communication with said passages;

valve means for controlling flow from said source of pressure through said passages;

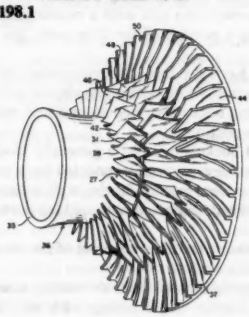
valve control means for opening said valve means responsive to actuator force.

4,502,837

MULTI STAGE CENTRIFUGAL IMPELLER

Lawrence W. Blair, Boxford, and Alexander C. Bryans, Reading, both of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Sep. 30, 1982, Ser. No. 429,735
Int. Cl.³ F01D *1/02*
U.S. Cl. 415—198.1 **21 Claims**



1. A centrifugal compressor for compressing a fluid comprising:

(a) an annular flow path, substantially parallel to an axis of rotation at an inlet and substantially perpendicular to the axis of rotation at an outlet, the outer surface of which is formed by a stationary shroud, and the inner surface of which is formed by a rotatable impeller hub; and

(b) an impeller comprising at least two rows of blades positioned upon a rotatable impeller hub, including:

(i) a first, inlet blade row comprising a plurality of blades extending from said hub at said inlet, each blade including a root and a tip and leading and trailing edges and being twisted from said root to said tip for obtaining blade lean for being matched to different substantially optimum generally axially extending curvilinear airstream lines at both the root and the tip for the purpose of producing a generally constant, pressure flow at the exit of said first blade row from said roots to said tips; and

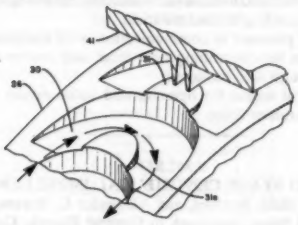
(ii) a second blade row comprising a plurality of blades extending from said hub at said outlet, said second blade row being axially spaced from said first blade row and each blade including a root and a tip and leading and trailing edges and being twisted from said root to said tip for obtaining blade lean for being matched to substantially different optimum generally radially extending curvilinear airstream lines at both the root and the tip for the purpose of producing a generally constant pressure flow at the exit of said second blade row from said roots to said tips.

4,502,838

SOLID WHEEL TURBINE

Arthur J. Miller, North Huntingdon, and Zaher M. Moussa, Greensburg, both of Pa., assignors to Elliott Turbomachinery Co., Inc., Jeannette, Pa.

Filed Jun. 21, 1982, Ser. No. 390,604
Int. Cl.³ F01D *1/02*
U.S. Cl. 415—202 **3 Claims**



1. In an impulse turbine having an inlet and an outlet with a flow path therebetween and with a nozzle ring and a turbine wheel forming a portion of the flow path, the improvement comprising:

said wheel having a first circumferential rim portion of a predetermined width with a plurality of uniformly spaced, overlapping buckets formed around said entire circumferential rim portion;

each of said buckets defining a generally U-shaped passage having two leg portions connected by a curved portion with said curved portion having a diameter less than said predetermined width and with said leg portions extending to said rim;

an island defining the inner segment of the curved portion of each bucket; and

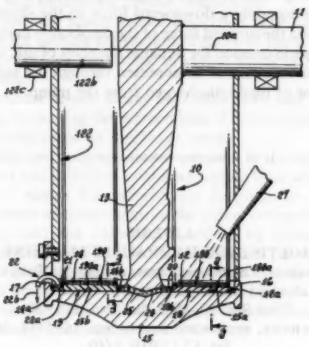
labyrinth sealing means circumferentially extending around said rim portion and coacting with said island of each bucket to provide a fluid seal between said leg portions which respectively define inlet and outlet fluid paths in said buckets.

4,502,839

VIBRATION DAMPING OF ROTOR CARRYING LIQUID RING

James P. Maddox, Sherman Oaks; Jack Jolley, Jr., Venice; Louis W. Drobnick, Santa Monica, and William E. Amend, Rolling Hills Estates, all of Calif., assignors to Transamerica Delaval Inc., Lawrenceville, N.J.

Filed Nov. 2, 1982, Ser. No. 438,477
Int. Cl.³ G01K *25/06*
U.S. Cl. 415—202 **17 Claims**



1. Rotary apparatus comprising

(a) a rotor having an axis and defining an annular channel to receive liquid that rotates with the rotor about the axis thereof,

(b) a matrix in the channel for trapping the liquid in the matrix, thereby to inhibit surge wave development that otherwise is productive of rotor vibration during such rotor and liquid rotation,

(c) the matrix including grooves to communicate fluid in a direction generally parallel to an axis defined by the rotor, the grooves having end openings and being closed in a direction toward said axis.

4,502,840

BLADE PITCH CONTROL IN ROTATABLE BLADED DEVICES FOR VEHICLES

Stephan Roman, 81 Beardsley Rd., Shelton, Conn. 06484

Filed Mar. 19, 1982, Ser. No. 360,072
Int. Cl.³ B64C *27/38*
U.S. Cl. 416—114 **11 Claims**

1. In an aircraft having rotatable blades,

(a) a stationary support, having a longitudinal axis, in the aircraft;

(b) a rotor journalled on the stationary support;

(c) blade supports mounted on and extending radially outward from the rotor;

(d) a blade connected to the outward end of each blade support; and

(e) means for varying the pitch angle of each of the blades comprising:

a swash plate

movably mounted on, and extending radially outward from the stationary support in a plane of rotation

generally transverse to the longitudinal axis of the stationary support, and

having a non-rotating inner portion mounted on the stationary support and a rotatable peripheral outer portion, journalled on, and radially outward of, the inner portion;

means for controllably varying the plane of rotation of the swash plate with respect to the axis of the support; and

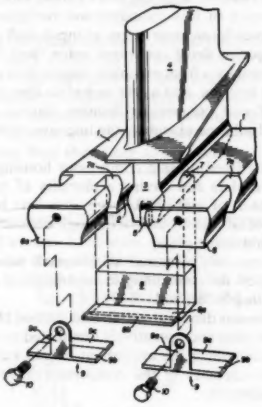
a connection between the rotatable portion of the swash plate and the blade support comprising a toggle joint having at least two links connected pivotally at a first pivot; one of the links being operatively connected to the blade support; the other link being pivotally anchored at a point remote from the first pivot to the rotor, and a connection between the first pivot and the rotatable portion of the swash plate.

4,502,841

FAN BLADE AXIAL LOCKING DEVICE

Georges Kebedjis, Alfortville, France, assignor to S.N.E.C.-M.A., Paris, France

Filed Oct. 18, 1983, Ser. No. 542,973
Claims priority, application France, Nov. 8, 1982, 82 18652
Int. Cl.³ F01D 5/08
U.S. Cl. 416—220 R **3 Claims**



2. An axial locking device for a blade assembly of a fan, the fan having a rotor disc with an axial groove of reentrant form in a rim thereof and each blade having a root of a form corresponding to that of the groove and being engaged therein by axial sliding, comprising:

lug means rigid with the blade root and abutting an upstream face of the disc,

a first and second adjacent tooth formed in an upstream face of the disc adjacent the periphery thereof, and having in said first tooth a radial slot facing a corresponding radial slot of said second tooth, and

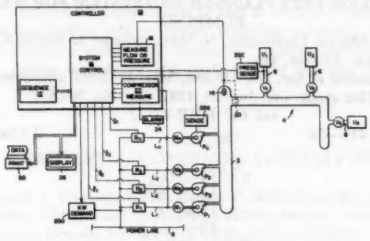
locking means engaged in said slots of said first and second tooth for axially locking said blade root wherein said locking means further comprises a key of parallelepiped form arranged in abutting relationship with said blade root, means for locking said key against radially outward motion and means defining an aligned bore through one of said first and second teeth, through an end portion of the key itself and with the material of the fan rim, and securing means extending through said aligned bore.

4,502,842

MULTIPLE COMPRESSOR CONTROLLER AND METHOD

Stephen M. Currier; Bert G. H. Penhollow, both of Quincy; Gordon G. Hof, Mendon, and Norbert L. Mast, Quincy, all of Ill., assignors to Colt Industries Operating Corp., New York, N.Y.

Filed Feb. 2, 1983, Ser. No. 463,126
Int. Cl.³ F04B 41/06
U.S. Cl. 417—8 **28 Claims**



1. A method for controlling the selective loading and unloading of a plurality of fluid pumps connected for fluid input to a fluid distribution system to maintain system pressure of a desired level, said method including the steps of:

(a) determining the total volume of the fluid distribution system;

(b) determining the rate of fluid leakage from the fluid distribution system;

(c) determining the effect of the output capacity of each fluid pump on the fluid distribution system;

(d) measuring any variation in demand on the fluid distribution system;

(e) employing said total volume and/or said rate of fluid leakage to ascertain the amount of change in fluid input to the fluid distribution system required to match said variation in demand;

(f) selecting one or more fluid pumps having a combined output capacity at least equal to said amount of change in fluid input to the distribution system required to match said variation in demand; and

(g) loading or unloading said one or more fluid pumps to provide said change in fluid input to the distributution system.

24. A multiple compressor and control system connected to a fluid distribution system so as to maintain system pressure at a desired level comprising:

a. transducer means positioned in said distribution system to sense the system pressure and provide an electrical output signal indicative of said system pressure, said transducer means including

a primary pressure transducer and a secondary pressure transducer, and electronic valve means for selectively connecting said primary transducer and said secondary transducer to either said distribution system or to atmosphere,

b. a plurality of compressors connected to said fluid distribution system,

c. a plurality of compressor control means connected to said compressors to start, load unload and stop said compressors, each such compressor being connected to one of said control means, and

d. a central multiple compressor controller connected to said compressor control means and to said transducer means, said multiple compressor controller including

(1) electronic data generating means connected to both said transducer means and said compressor control means and operative to provide electrical data signals indicative of compressor condition and system pressure;

(2) data storage means for receiving said electrical data signals from said electronic data generating means, and

(3) system controller means to provide control signals to said compressor control means.

4,502,843

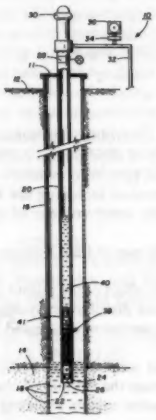
VALVELESS FREE PLUNGER AND SYSTEM FOR WELL PUMPING

Jack E. Martin, Farmington, N. Mex., assignor to Noodle Corporation, Abilene, Tex.

Continuation of Ser. No. 135,684, Mar. 31, 1980, abandoned. This application Jun. 28, 1982, Ser. No. 392,601

Int. Cl.³ F04B *47/12*

U.S. Cl. 417—56 **2 Claims**



1. A rugged lightweight valveless plunger for free plunger well pumping comprising;

(a) an elongated cylindrical aluminum body comprising:

(i) a sealing section extending substantially the length of the body and formed by a plurality of circumferential grooves defining a plurality of annular aluminum sealing flanges;

said grooves having the same width as the flanges and being closely spaced to increase the number thereof per unit of longitudinal length of the aluminum body, said grooves having curved inner surfaces each characterized by a radius equal to one-half the groove width;

(ii) a fishing neck section having a smaller diameter than said annular sealing flanges; and

(iii) a curved transition section of increasing diameter from said fishing neck section to said sealing section;

(b) a pair of steel collars secured to said aluminum body on opposite longitudinal ends of said sealing section and having the same outer diameter as said annular sealing flanges;

(c) one of said collars having a main section proximate said annular sealing flanges and also having a curved transition section of decreasing outer diameter to meet said curved transition section of said aluminum body in smooth profile; and

(d) a steel neck cap secured to the end of said fishing neck section opposite said one collar and having a greater outer diameter than said fishing neck section;

whereby the steel collars provide wear resistance and protection for the annular aluminum sealing flanges.

4,502,844

REFRIGERANT COMPRESSOR WITH MECHANISM FOR ADJUSTING CAPACITY OF THE COMPRESSOR

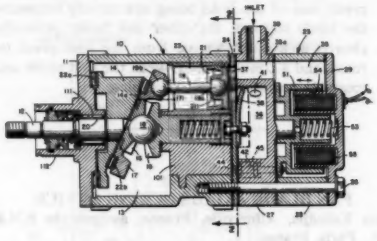
Shogo Kimura, Yabuzukahonmachi, and Haruo Takahashi, Takasaki, both of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Oct. 20, 1982, Ser. No. 435,629

Claims priority, application Japan, Oct. 27, 1981, 56-159023[U]

Int. Cl.³ F04B *49/00*

U.S. Cl. 417—275 **7 Claims**



1. In a refrigerant compressor including a compressor housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent said cylinder block, a piston slidable within each of said cylinders and reciprocated by a wobble plate driven by an input rotor, an input shaft connected to said input rotor to drive said input rotor, said input shaft rotatably supported by a front end plate disposed on one end of said compressor housing, and a rear end plate disposed on the opposite end of said compressor housing having a suction chamber and a discharge chamber, the improvement comprising:

a rear end plate fixed on said compressor housing together with a valve plate and having a plurality of dead space chambers, each of said dead space chambers being connected to one of said cylinders through connecting holes formed in said valve plate;

valve means movably disposed within each of said dead space chambers for controlling the opening and closing of said connecting holes; and

valve control means disposed within said suction chamber of said rear end plate and operatively connected to said valve means for controlling the movement of said valve means to adjust the capacity of the compressor in response to external conditions.

4,502,845

MULTISTAGE GEAR PUMP AND CONTROL VALVE ARRANGEMENT

Howard E. Chana, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

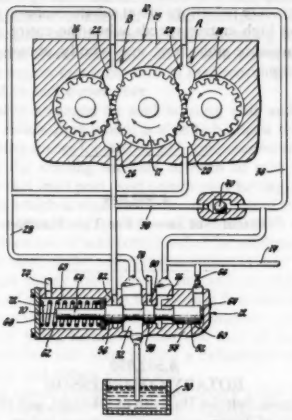
Filed Mar. 24, 1983, Ser. No. 478,248

Int. Cl.³ F04B *49/08*

U.S. Cl. 417—288 **3 Claims**

1. A multistage gear pump and control valve arrangement comprising at least two hydraulic gear pump sets each having a suction port connected to a common sump and a discharge port for delivering hydraulic fluid to both a main circuit line and a secondary circuit line, only one of said discharge ports being continuously open to said main circuit line, a check valve for connecting the other of said discharge ports to said main circuit line and preventing reverse flow, and regulator valve means for regulating the pump discharge to said main circuit line by maintaining delivery thereto of the discharge from both said discharge ports below a first predetermined main circuit line pressure setting and diverting fluid therefrom to said secondary line to thereby also deliver pump discharge to the latter line in response to the main circuit line pressure increasing

above said first predetermined setting while both said discharge ports are delivering fluid thereto and being responsive to main circuit line pressure increasing above a second predetermined setting to connect said other discharge port to said sump to thereby effect closure of said check valve and relieve the associated gear pump set of hydraulic work while again



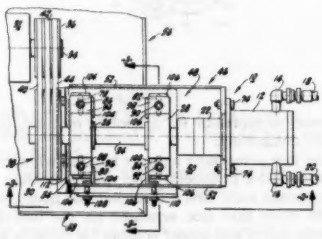
regulating the pump discharge to said main circuit line by first diverting fluid therefrom to said secondary circuit line as before but with only said one discharge port delivering fluid thereto and then on further increase in main circuit line pressure above a third predetermined setting regulating the pump discharge by said one discharge port to both said circuit lines by diverting fluid therefrom to said sump.

4,502,846

APPARATUS FOR TRANSFERRING FLUID

Cesar E. Cavanna, Livermore, Calif., assignor to Richmond Lox Equipment Company, Livermore, Calif.

Filed Mar. 9, 1981, Ser. No. 241,541
Int. Cl.[3] F04B *17/00*; F16M *7/00*
U.S. Cl. 417—362 **9 Claims**



1. An apparatus for transferring fluid comprising:

a. a motor having a rotating shaft as the mechanical output of said motor and a coupling located between said motor and said shaft;

b. means for pumping the fluid including a rotating shaft as the mechanical input of said pumping means, said motor rotating shaft being spaced a selected distance from said pumping means rotating shaft;

c. means for transmitting the work of said motor rotating shaft to said pumping means rotating shaft;

d. means for adjusting the distance between said motor shaft and said pumping means shaft;

said adjusting means including a motor and shaft support having a substantially horizontal bottom, upright side portions around said bottom forming an enclosure having a mouth;

said motor rotating shaft including at least one bearing, said at least one bearing being fastened to said bottom of said motor and shaft support;

said motor being connected to one of said side portions and positioned outside said enclosure, said coupling being connected to said one side portion and positioned inside said enclosure, said motor shaft extending through said enclosure for connection to said at least one bearing;

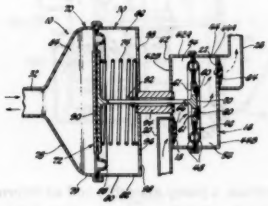
said adjusting means further including a support for said pumping means and means for guiding movement between said motor and shaft support and said pumping means.

4,502,847

EXHAUST GAS OPERATED VACUUM PUMP ASSEMBLY

Donald J. Pozniak, Utica; Gerald F. Robertson, Mt. Clemens, both of Mich., and Michael J. McClain, Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 29, 1982, Ser. No. 427,651
Int. Cl.[3] F04B *35/00, 39/00*
U.S. Cl. 417—380 **6 Claims**



1. In combination, a pump assembly and an internal combustion engine which generates exhaust gases having pressure pulsations of varying pressure, frequency and amplitude at different engine speeds, said pump assembly comprising:

a pump means for pumping a fluid and including a reciprocable pumping member movable through first and second strokes,

an actuating means including a reciprocable actuating member movable through first and second strokes and which is connected to said pumping member to move the same through its first and second strokes,

one side of said actuating member being in communiation with said exhaust gases and said pressure pulsations during their increasing pressure phase of each amplitude causing the actuating member and pumping member to be moved through their first stroke and during their decreasing pressure phase of each amplitude allowing the actuating and pumping members to be moved through their second stroke,

and spring means operatively engageable with one of said actuating and pumping members for biasingly opposing movement of said actuating and pumping members through their first strokes and for moving said actuating and pumping members through their second strokes during the decreasing pressure phase of each amplitude of the pressure pulsations, said spring means having a non-linear variable spring rate which exerts a progressively higher biasing force as the pressure of the exhaust gas pulsations increases with increasing engine speed whereby said pump assembly is operable to pump said fluid over a wide range of engine speeds and during engine speeds when portions of the amplitude of the pressure pulsations are at subatmospheric pressure and during engine speeds when

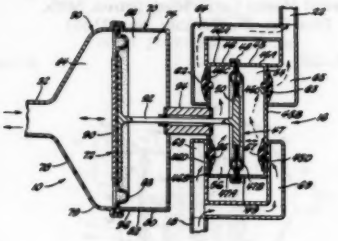
the entire amplitude of the pressure pulsations is wholly above atmospheric pressure.

4,502,848

EXHAUST GAS OPERATED VACUUM PUMP ASSEMBLY

Gerald F. Robertson, Mt. Clemens, and Donald J. Pozniak, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 29, 1982, Ser. No. 427,652
Int. Cl.³ F04B *35/00, 39/00*
U.S. Cl. 417—380 **4 Claims**



1. In combination, a pump assembly and an internal combustion engine which generates exhaust gases having pressure pulsations of varying pressure and amplitude at different engine speeds and with portions of the amplitude being at subatmospheric pressure at low engine speeds and with said amplitudes being wholly above atmospheric pressure at high engine speeds, said pump assembly comprising:

a pump means for pumping a fluid and including a reciprocable pumping member movable through first and second strokes, an actuating means including a housing, and a reciprocable actuating member movable through first and second strokes and which is drivingly connected to said pumping member to move the same through its first and second strokes, said actuating member dividing said housing into first and second chambers, said first chamber being in communication with the exhaust gases and said pressure pulsations during their increasing pressure phase of each amplitude causing the actuating member and pumping member to be moved through their first strokes, bleed hole means in said housing for communicating said second chamber to atmosphere, said second chamber and bleed hole means defining an air spring means for biasingly opposing movement of said actuating and pumping members through their first strokes and for effecting movement of the actuating and pumping members through their second strokes during the decreasing pressure phase of each amplitude of the pressure pulsations, said actuating member when at rest having a position spaced from one side of said bleed hole means, said exhaust gas pressure pulsations causing said actuating member to be reciprocated through strokes having a displacement such that said bleed hole means remains uncovered during low speed engine operation, through strokes having a displacement such that said bleed hole means is alternately covered and uncovered by said actuating member during medium speed operation of the engine and through strokes having a displacement wholly on the other side of said bleed hole means to at all times block communication between said second chamber and the atmosphere via said bleed hole means during high speed engine operation whereby said air spring means functions as a non-linear variable rate air spring means and said pump assembly is operable to pump said fluid during low engine speeds and loads when portions of the amplitude of the pressure pulsations are at subatmospheric pressure and during high engine speeds when the entire amplitude of the pressure pulsations are wholly above atmospheric pressure.

4,502,849

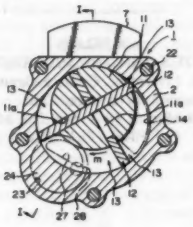
Patent Not Issued For This Number

4,502,850

ROTARY COMPRESSOR

Mitsuo Inagaki; Seitoku Ito, both of Okazaki, and Hisashi Aoki, Kariya, all of Japan, assignors to Nippon Soken, Inc., Nishio and Nippondenso Co., Ltd., Kariya, both of, Japan

Filed Apr. 1, 1982, Ser. No. 364,608
Claims priority, application Japan, Apr. 7, 1981, 56-52132; Feb. 15, 1982, 57-021227
Int. Cl.³ F04B *49/02*
U.S. Cl. 417—440 **13 Claims**



1. A rotary compressor for a cooling medium, the rotary compressor comprising:

a housing unit comprising a center housing which has opposite ends and a peripheral inner wall extending between said opposite ends, first and second side plates, each having an inner side face arranged on the corresponding opposite end of said center housing for defining part of an interior space between said inner side faces of said first and second plates;

a rotor eccentrically and rotatably arranged within said housing unit, said rotor and said peripheral inner wall further defining therebetween said interior space;

vane means slidably mounted on said rotor and extending in a radial direction of said rotor, said vane means having ends each of which continuously sealingly contacts said peripheral inner wall of said housing unit for dividing said interior space into a plurality of movable and variable working spaces;

an inlet port formed in said housing unit and being open to said interior space for feeding the cooling medium into said working spaces;

an outlet port formed in said housing unit and being open to said interior space for discharging the cooling medium from said working spaces, said interior space having a suction region, a discharge region, and a compression region located between said suction region and said discharge region, each of said working spaces successively passing through said suction region in which each of said working spaces is connected to said inlet port, said compression region in which each of said working regions is disconnected from said inlet and outlet ports, and said discharge region in which each of said working spaces is connected to said outlet port;

a rotary valve arranged in said housing unit and having therein a return port which is able to be open to each of said working spaces located in said compression region for returning the cooling medium in each of said working spaces to said inlet port, said return port having an opening region which is expandable in a direction of the movement of said working spaces in accordance with the rotational movement of said rotary valve for changing a timing of the start of the compression action of said working spaces, said rotary valve having an end face which forms a portion of said inner side face of said first side plate and which is partially exposed in said interior space, said return port being formed in said end face of said rotary valve, said first side plate having a cylindrical cavity for supporting said rotary valve; and

an actuating means connected to said rotary valve for rotating said rotary valve, wherein said housing further comprises a first side housing which is arranged on said first side plate, so as to form a suction pressure space therebetween, said suction pressure space being in communication with said return port of said rotary valve and said inlet port formed in said first side plate, and wherein said actuating means is fixed onto said first side housing and connected to said rotary valve, which extends into said suction pressure space through said first side plate.

4,502,851

PIVOTAL DISCHARGE APPARATUS

Vaughn Calvin, and Raymond J. Cox, both of P.O. Box 3908, Bryan, Tex. 077805

Filed Nov. 12, 1982, Ser. No. 441,269
Int. Cl.³ F04B *15/02*
U.S. Cl. 417—516 **26 Claims**

1. A pipe apparatus for discharging material from a pump having a first pump outlet and a second pump outlet arranged substantially coplanar with each other comprising:

(a) a discharge pipe having an inlet for receiving material from the pump;

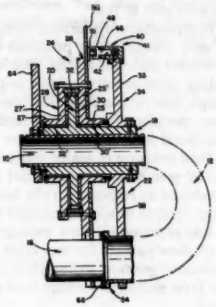
(b) a distribution duct having an end connected to said discharge pipe for pivotal movement therewith and a free end for communication alternately with said first and second pump outlets;

(c) a pivot arm secured for rotation about said discharge pipe and fixed to said distribution duct;

(d) means for pivoting said arm about said discharge pipe;

(e) a pivot housing fixed with respect to said arm;

(f) a thrust wear member connected to said arm and extending radially with respect to said discharge pipe for engaging said pivot housing to control forces on said pivot arm; and



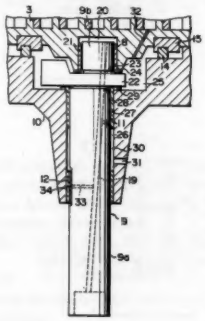
(g) said wear member cooperating with said pivot housing to offset torque forces imposed by material being pumped through said distribution duct.

4,502,852

OIL FEEDING DEVICE FOR SCROLL FLUID APPARATUS

Eiichi Hazaki, Shimizu, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 7, 1982, Ser. No. 366,310
Claims priority, application Japan, Apr. 17, 1981, 56-57151
Int. Cl.³ F01C *1/02, 21/04*
U.S. Cl. 418—55 **4 Claims**



1. An oil feeding device for a scroll fluid apparatus including a stationary scroll member, an orbiting scroll member engaging said stationary scroll member for orbiting movement, a crankshaft for driving said orbiting scroll member for orbiting movement, a first plain bearing journalling a crank portion of said crankshaft, a second plain bearing and a third plain bearing for journalling a shaft portion of said crankshaft, and an intermediate chamber formed at the back of said orbiting scroll

member and having a pressure intermediate between a discharge pressure and a suction pressure for receiving lubricant oil fed to said first and second plain bearings and released therefrom, characterized in that

recessed oil flow passages are formed on an outer peripheral surface of said crankshaft at positions corresponding to said first, second and third plain bearings, respectively, and extending substantially axially with respect to the plain bearings, said recessed oil flow passages are located on the outer peripheral surface of said crankshaft in a position displaced from a line of action of a lateral force applied by fluid pressure in sealed spaces defined between said two scroll members, so as to offset a bearing oil film reaction produced in response to the lateral force;

a single passage formed in said crankshaft for feeding lubricant oil to said recessed oil flow passages;

said recessed oil flow passage for said third plain bearing has a lower resistance portion to the flow of fluid than said recessed oil flow passages for said first and second plain bearings; and

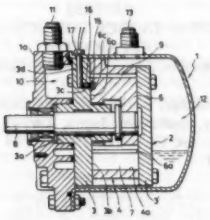
at least two separate duct means formed in said crankshaft and communicating with the single passage for respectively feeding lubricant from said single passage to the recessed oil flow passages formed on the outer peripheral surfaces of the crankshaft at the positions corresponding to the second and third plain bearings.

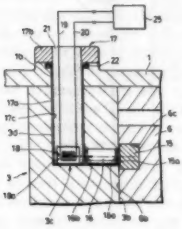
4,502,853

ROTATIONAL SPEED SENSOR FOR VANE COMPRESSORS

Shinichi Ohi, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Feb. 14, 1984, Ser. No. 580,100
Claims priority, application Japan, Feb. 22, 1983, 58-24723[U]
Int. Cl.³ G01P *3/487;* F01C *21/00*
U.S. Cl. 418—2 **7 Claims**





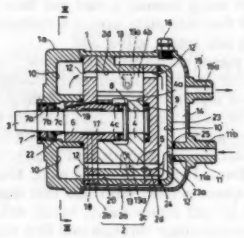
1. In a vane compressor including a rotary shaft, a rotor disposed for rotation about an axis thereof together with said rotary shaft, said rotor having an outer peripheral surface formed with a plurality of axial slits, a plurality of vanes radially slidably fitted in respective ones of said slits, and a pump housing accommodating said rotor and said vanes, wherein rotation of said rotor together with said rotary shaft causes said rotor, said vanes and said pump housing to cooperate to define pump working chambers therebetween for pumping actions of fluid, a rotational speed sensor for sensing the rotational speed of said rotor, which comprises: a permanent magnet embedded in one end face of said rotor and disposed to develop a magnetic field axially of said rotor; a pin formed of a ferromagnetic material, said pin being arranged in said pump housing at a location facing said one end face of said rotor, said pin having one end face disposed to encounter said permanent magnet each time said rotor makes one rotation; and a magnetically sensing element disposed opposite another end face of said pin.

4,502,854

VANE COMPRESSOR HAVING REARWARDLY LOCATED SUCTION CONNECTOR AND DISCHARGE CONNECTOR

Tsunenori Shibuya; Yutaka Ishizuka, and Teruo Nakamura, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Saitama, Japan

Filed Mar. 21, 1983, Ser. No. 477,015
Claims priority, application Japan, Mar. 23, 1982, 57-45856
Int. Cl.³ F04C *18/00, 29/00*
U.S. Cl. 418—15 **5 Claims**



1. In a vane compressor including a cam ring having an endless camming inner peripheral surface, opposite ends and a peripheral wall; front and rear side blocks secured to said opposite ends of said cam ring and defining a pump housing in cooperation with said cam ring, said pump housing having at least one pump inlet and at least one pump outlet; a cylindrical rotor accommodated within said pump housing and having an outer peripheral surface thereof formed with a plurality of slits; a plurality of vanes radially slidably fitted in said slits of said rotor, adjacent ones of said vanes cooperating with said pump housing and said rotor to define therebetween pump working chambers communicating with said pump inlet or said pump outlet; a front head secured to said front side block, said front head having a sealing chamber formed therein and an annular front suction chamber formed around said sealing chamber and communicating with said pump working chambers on suction strokes thereof through said pump inlet; a drive shaft extending through said sealing chamber and said front side block and having an end portion thereof supporting said rotor for rotation in unison therewith; seal means accommodated in said sealing chamber for sealing the clearance between said drive shaft and said front head;

the improvement comprising:

at least one front pump inlet formed through said front side block and at least one rear pump inlet formed through said rear side block, said front pump inlet and said rear pump inlet forming said pump inlet, said front suction chamber communicating with said front pump inlet;

a discharge pressure chamber communicating with said at least one pump outlet;

a partition member defining a rear suction chamber between said partition member and a rear side of said rear side block, said suction chamber communicating with said pump working chambers on suction strokes thereof

through said rear pump inlet and with said suction port; and

passage means comprising a passage extending through said rear side block, said peripheral wall of said cam ring and said front side block and directly communicating said rear suction chamber with said front suction chamber, wherein a suction connector and a discharge connector are arranged at a rear portion of said compressor, said suction connector having a suction port formed therethrough and communicating with said rear suction chamber, and said discharge connector having a discharge port formed therethrough for communication with said discharge pressure chamber.

4,502,855

ROTARY PISTON MACHINE WITH PARALLEL INTERNAL AXES

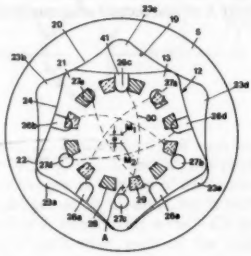
Hans C. Petersen, and Svend E. Thomsen, both of Nordborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Nov. 10, 1983, Ser. No. 550,317

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1982, 3243394

Int. Cl.³ F04C *2/10, 15/02*

U.S. Cl. 418—15 **14 Claims**



1. A rotary piston machine comprising, a housing, inlet and outlet passage means, oppositely facing wall means in said housing, meshing externally and internally toothed gerotor type star and ring gears wherein said star gear rotates and gyrates relative to said ring gear to form expanding and collapsing chambers therebetween, said gears being between said wall means in sealing engagement therewith, said gears having parallel axes with the axis of said star gear being gyratable relative to the axis of said ring gear, shaft means for turning said star gear relative to said ring gear, said wall means having inlet and outlet sets of circumferentially and alternately arranged commutating supply and exhaust control orifices connected respectively to said inlet and outlet passage means, said star gear having at least one ring of control orifices concentric with said axis thereof and indexed relative to the crests of the teeth thereof, said one ring of orifices being commutatingly cooperable with said supply and exhaust orifices for supplying fluid to and exhausting fluid from said chambers, said star gear having chamber ports at the periphery thereof indexed so as to be between said tooth crests thereof and have fluid communication with said chambers, said one ring of orifices being respectively connected by passages with said chamber ports with the corresponding ones of said one ring of orifices being positioned on diametrically opposite sides of said star gear from the corresponding ones of said chamber ports.

4,502,856

VANE PUMP WITH SPRING SEALING ELEMENTS AGAINST THE VANE FACES

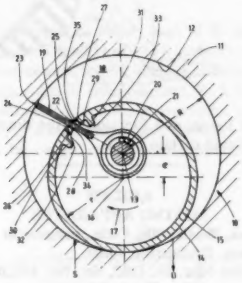
Rüdiger Frank, Gerlingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 10, 1983, Ser. No. 503,106

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1982, 3235581

Int. Cl.³ F04C *2/00, 15/00;* F16J *15/32*

U.S. Cl. 418—137 **21 Claims**



1. A vane pump hacving an outer housing part with an inner bore, an inner housing part disposed eccentrically within said inner bore of said outer housing part and rotatable about an axis therein, which together define a work chamber, at least one radially extending vane within the inner housing part, said at least one radial vane passes through an opening in the inner housing part and protrudes into the work chamber in sealing engagement with said inner bore, sealing elements disposed in the vicinity of said opening in said inner housing and positioned to produce a spring force between the at least one vane and the inner housing part forming said opening, wherein the sealing elements are embodied as curvilinear spring elements which are secured on each side of the vane and supported on the inner housing part at a fastening location, said curvilinear spring elements including a lip section at a distance from the fastening location which presses against the associated outer face of the vane in a yielding, elastic manner effectively sealing the vane inside the opening and centering the vane upon the shutdown of the pump.

4,502,857

GREEN TIRE-TO-MOLD CONTACT TIME DETECTION, ANALYSIS, AND CONTROL

William L. Hinks, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 4, 1983, Ser. No. 482,111

Int. Cl.³ B29H *17/00*

U.S. Cl. 425—29 **17 Claims**

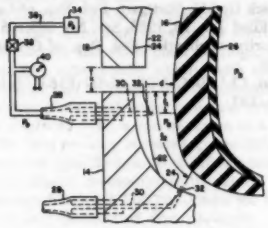
1. Apparatus for monitoring the rate of growth of a tire prior to curing, comprising:

first and second mold halves for receiving the tire therebetween, said mold halves having mold sidewall surfaces, and mold rib and mold tread surfaces for imparting a tread design to the tire;

first means for closing said mold halves while expanding the tire under pressure;

sensing means in operative communication with certain of said mold surfaces for sensing the approach or contact of the tire at certain points about said mold surfaces; and

control means interconnected between said sensing means and said first means for regulating the rate of closure of



said mold halves as a function of the times of contact of the tire at said certain points.

4,502,858

MIXING APPARATUS

Mark E. Kertok, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 30, 1983, Ser. No. 480,207

Int. Cl.³ B29B *1/02*

U.S. Cl. 425—204 **11 Claims**

1. Apparatus comprising

(a) a first shaft having a first axis, arranged for rotation around this first axis,

(b) a first set of pins attached to said first shaft,

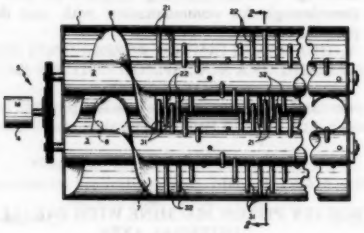
(c) a second shaft having a second axis, arranged for rotation around this second axis, said first and second axis being substantially parallel to each other,

(d) a second set of pins attached to said second shaft,

(e) means for rotating both shafts at the same azimuthal speed,

with the proviso that

(f) said first set of pins is arranged on said first shaft in the form of two helices A and B, the pins of helix A being offset with respect to the pins of helix B both azimuthally and axially,



(g) said second set of pins is arranged on said second shaft in the form of two helices A and B, the pins of helix A being offset with respect to the pins of helix B both azimuthally and axially,

(h) upon rotation of the shafts the pins of helix A of said first set and pins of helix B of said second set sequentially interdigitate, and the pins of helix B of said first set and the pins of helix A of said second set sequentially interdigitate.

4,502,859

HIDE TANNING COMPOSITION AND METHOD OF PREPARING SAME

Dale B. Knobloch, Northglenn, Colo., assignor to Rockmont Industries, Inc., Broomfield, Colo.

Filed Apr. 11, 1983, Ser. No. 483,531
Int. Cl.³ C14C *3/02, 3/04, 3/06*
U.S. Cl. 8—94.29 **16 Claims**

1. An animal hide tanning composition comprising in solution by weight minor proportions of borax, alum and an emulsifying agent, and a major proportion of a carrier, said carrier containing water and a water-emulsive oil.

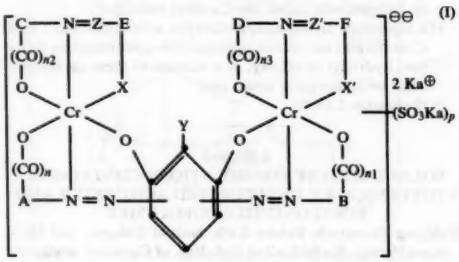
4,502,860

BIS-1:2-CHROMIUM COMPLEXES OF DISAZO DYES, AND THEIR PREPARATION AND USE

Gerhard Back, Lörrach, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 20, 1983, Ser. No. 505,646
Claims priority, application Switzerland, Jul. 2, 1982, 4052/82
Int. Cl.³ C09B *45/26*
U.S. Cl. 8—437 **15 Claims**

1. A chromium complex dye of the formula I



in which Z and Z', independently of each other, each are nitrogen or a —CH group, X and X', independently of each other, each are oxygen or a group of the formula —NR—, in which R is hydrogen or C_1–C_4-alkyl, but X and X' have to be oxygen when Z or Z' respectively is the —CH group, A and B, independently of each other, each are the radical of a diazo component of the benzene or naphthalene series which carries the hydroxyl or carboxyl group in o-position relative to the azo group, C and D, independently of each other, each are a radical of the benzene or naphthalene series with carries a hydroxyl or carboxyl group in o-position relative to the azo or azomethine group, or, if n_2 and/or $n_3=1$ and Z is a —CH group, the radical of an aliphatic, cycloaliphatic or aromatic aminocarboxylic acid, E and F, independently of each other, each are the radical of a coupling component when Z is nitrogen, the coupling component containing the group X or X' in o- or α-position relative to the azo group, or the radical of an o-hydroxyaldehyde when Z is the —CH group, Y is C_1–C_4-alkyl or hydrogen, n, n_1, n_2 and n_3, independently of one another, each are 0 or 1, p is an integer from 1 to 6, and Ka⊕ is a cation.

4,502,861

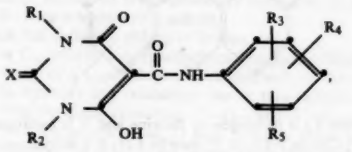
STORAGE STABLE MOTHPROOFING FORMULATIONS

Carl Becker, and Fritz Heizler, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 25, 1982, Ser. No. 411,163
Claims priority, application Switzerland, Sep. 3, 1981, 5686/81
Int. Cl.³ A01N *43/54*
U.S. Cl. 8—490 **26 Claims**

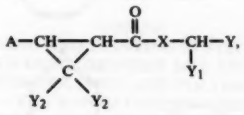
1. A storage stable mothproofing formulation which comprises

A. 0.5 to 20% by weight of a 5-phenylcarbamoylbarbituric acid compound of the formula

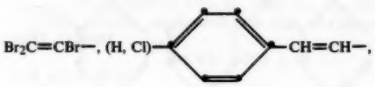


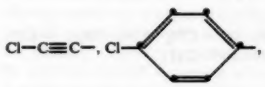
wherein X is oxygen or sulfur, each of R_1 and R_2 independently of the other is alkyl of 1 to 4 carbon atoms, alkenyl of 3 or 4 carbon atoms, benzyl, phenyl or substituted phenyl, R_3 is halogen, nitro or trihalomethyl, R_4 is hydrogen, halogen or trihalomethyl, and R_5 is hydrogen, halogen, methyl or methoxy, or a tautomer or salt thereof,

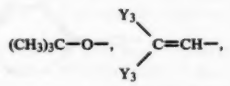
B. 0.5 to 20% by weight of a synthetic pyrethroid of the formula



wherein A is



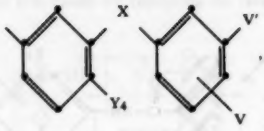




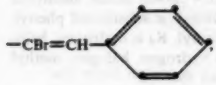
wherein Y_3 is Cl, Br, CF_3, F or methyl, CH_2=CH—CH_2—O— or

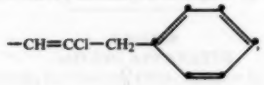
wherein each of a, b, c and d independently of one another is Cl, Br or F, and c and d may also be methyl; X is oxygen or sulfur; Y_1 is hydrogen, CN, CH_3, C_2H_5, i-C_3H_7,

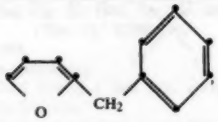
—C≡CH, —C≡C—CH_3, —C≡C—C_6H_5, —CH=CH—CH_3, —CH_2—CH=CH_2, —CH=CH_2 or =CH_2—CH=CHCl; Y_2 is methyl or both Y_2's together complete a cyclopropane, cyclobutane or cyclopentane ring, and Y is

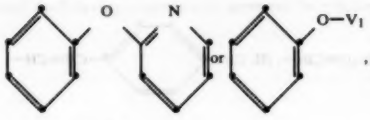


wherein Y_4 is hydrogen or fluorine and V is hydrogen, Cl, Br, F, CH_3 or NO_2, or V' may be CH_3 if V is hydrogen, and X is as defined above; and Y is also

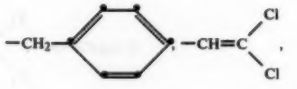








wherein V_1 is $-CH_2-CH=CH_2$, $-CH_2-CH=CH$, $-CH_2-CH=CH-CH_3$,



$-CF=CFCl$ or $-CF=CF_2$, and

C. 1 to 90% by weight of one or more fatty amines or cycloaliphatic amines and/or fatty acid amides, or derivatives thereof.

15. A method of protecting keratinous material, in particular wool textiles, from attack by pests that feed on keratin, which method comprises preparing a treatment bath by diluting an effective amount of a formulation as claimed in claim **1**, to which bath there may be added further conventional textile auxiliaries and/or dyes, and impregnating the material to be protected with said bath.

4,502,862

CATIONIC POLYAZO DYESTUFFS, THEIR STABLE SOLUTIONS, THEIR PREPARATION, AND THEIR USE

Roderich Rave, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

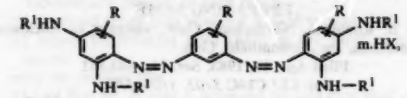
Filed Jan. 16, 1984, Ser. No. 571,011

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1983, 3303512

Int. Cl.[3] **C09B** *44/04;* **D06P** *1/08, 3/32*

U.S. Cl. 8—437 **10 Claims**

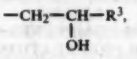
1. A cationic polyazo dyestuff of the formula



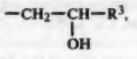
in which

R represents hydrogen C_1–C_4-alkyl, C_1–C_4-alkoxy or halogen,

R^1 represents hydrogen or the radical



at least one R^1 representing



R^3 represents hydrogen, or an optionally hydroxyl-, alkoxy- or halogen-substituted C_1–C_4-alkyl radical,

HX represents an aliphatic carboxylic acid which has 1 to 4 C atoms and which can optionally be substituted by halogen, hydroxyl or alkoxy, or a mixture of these carboxylic acids with inorganic acids, and

m designates 2 to 10.

4,502,863

SOLID DYESTUFF FORMULATIONS CONTAINING ETHYLENICALLY UNSATURATED ACID, ESTER AND ACRYLONITRILE COPOLYMER

Wolfgang Bornatsch; Robert Kuth, both of Cologne, and Hermann Perrey, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 3, 1983, Ser. No. 501,035

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1982, 3223333; Jul. 24, 1982, 3227675

Int. Cl.[3] **C09B** *67/02;* **D06P** *1/16, 3/54*

U.S. Cl. 8—524 **5 Claims**

1. A solid dyestuff formulation comprising a water-insoluble textile dyestuff, a disperstant and a polymeric protective colloid which is a copolymer of at least

(a) an α,β-ethylenically unsaturated monocarboxylic acid,

(b) a non-basic ester of an α,β-ethylenically unsaturated monocarboxylic acid, and

(c) acrylonitrile, the weight ratio of the monomer components (a):(b):(c) being 10–50:89–10:1–40.

4,502,864

CROWN ETHER COMPLEXES OF DIRECT YELLOW 11 AND DYESTUFF CONTAINING SAME

Jo Ann Cleverdon, Mobile, Ala., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 25, 1984, Ser. No. 603,863

Int. Cl.[3] **D06P** *67/00*

U.S. Cl. 8—527 **6 Claims**

1. A process for the preparation of liquid CI Direct Yellow 11 (Paper Yellow) in stable form from the tetrasodium Paper Yellow complex in reaction mass, filter cake or dry powder form of the base-catalyzed condensation reaction of 4-nitrotoluene-2-sulfonic acid which comprises the steps of suspending the tetrasodium Paper 11 complex in an aqueous medium containing a sodium-complexing agent selected from the group consisting of 18-crown-6 and 15-crown-5 ether; heating said suspension until completely dissolved; then removing sufficient water to adjust the liquid product to the desired dye concentration.

4,502,865

FIBRE-REACTIVE CHROMIUM COMPLEX DYES, PROCESS FOR THEIR MANUFACTURE AND USE THEREOF TO DYE CELLULOSE OR WOOL

Gerhard Back, Lörrach, Fed. Rep. of Germany; Fabio Beffa, Riehen, and Hans-Ulrich Schütz, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

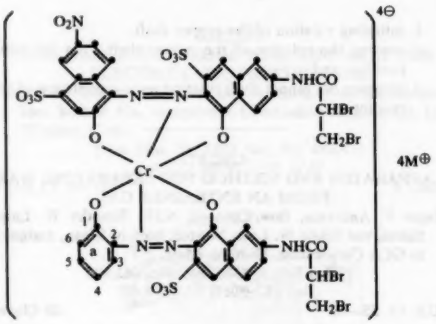
Division of Ser. No. 199,789, Oct. 23, 1980, Pat. No. 4,432,898, which is a continuation of Ser. No. 971,140, Dec. 19, 1978, abandoned, which is a continuation of Ser. No. 805,754, Jun. 13, 1977, abandoned. This application Dec. 2, 1983, Ser. No. 557,715

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1976, 8086/76; Switzerland, Mar. 14, 1977, 3153/77

Int. Cl.[3] C09B *45/16, 62/50;* D06P *1/38, 3/14*

U.S. Cl. 8—543 4 Claims

1. A process for dyeing or printing a substrate of cellulose or shrinkproofed wool, comprising the step of applying to the substrate a chromium complex dye of the formula



wherein the ring a is substituted by 4- or 5-nitro, and M is a cation.

4,502,866

SYMMETRICAL UNSUBSTITUTED AND SUBSTITUTED 2-HALO-4-(4'-(TRISULFONAPHTHYLAZO)-PHENYLAMINO)-1,3,5-TRIAZIN-6-YLAMINO COMPOUNDS

Kurt Brenneisen, Grenzach-Wyhlen, Fed. Rep. of Germany, and Werner Koch, Bottmingen, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

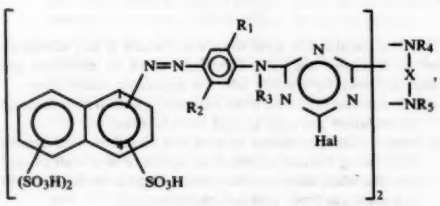
Filed Nov. 28, 1980, Ser. No. 210,770

Claims priority, application Switzerland, Dec. 6, 1979, 10833/79; Apr. 8, 1980, 2700/80

Int. Cl.[3] C07C *251/50;* C09B *62/04*

U.S. Cl. 8—549 20 Claims

1. A compound of the formula



(I)

or a salt thereof, wherein

each R_1 is hydrogen, C_{1-4}alkyl or C_{1-4}alkoxy,

each R_2 is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy or —NHCOR$_6$, wherein R_6 is C_{1-4}alkyl, amino, C_{1-4}alkylamino or di-(C_{1-4}alkyl)amino,

each R_3 is hydrogen or C_{1-4}alkyl,

each of R_4 and R_5 is independently hydrogen, C_{1-4}alkyl or 2-, 3- or 4-hydroxy(C_{2-4}alkyl),

each Hal is fluoro, chloro or bromo, and

X is C_{3-10}alkylene monosubstituted or disubstituted by hydroxy or C_{3-10}alkylene monosubstituted or disubstituted by hydroxy and containing one or two radicals selected from the group consisting of —O— and —N(C_{1-4}alkyl)—, with the provisos that (1) each hydroxy group present is separated by at least two carbon atoms from the —NR$_4$— and —NR$_5$— radicals, any other hydroxy group present and any —O— or —N(C_{1-4}alkyl)— radical present and (2) any —O— or —N(C_{1-4}alkyl)— radical present is separated by at least two carbon atoms from any other such radical present, the —NR$_4$— and —NR$_5$— radicals and each hydroxy group present,

with the proviso that the two R_1's are the same, the two R_2's are the same, the two R_3's are the same, the two Hal's are the same and the two naphthalene rings are identically substituted, or a mixture of such compounds in free acid or salt form.

4,502,867

PAD-DYEING AND PRINTING SYNTHETIC FIBER MATERIALS USING DISPERSE DYE AND CARBOXYL SYNTHETIC POLYMER AND POLYSACCHARIDE THICKENER COMBINATION

Friedrich Reinhardt, Bad Soden am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 452,323, Dec. 22, 1982, abandoned. This application Dec. 29, 1983, Ser. No. 566,965

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1981, 3151451

Int. Cl.[3] D06P *1/48*

U.S. Cl. 8—557 9 Claims

1. In a process for pad-dyeing or printing a sheet-like textile of synthetic fiber material with a disperse dyestuff dispersed in an aqueous medium in association with an anionic or nonionic dispersant, the padding liquor or print paste containing in addition to the aqueous dyestuff dispersion a thickening agent comprising a water-soluble synthetic polymerization product containing one or more carboxylic acid groups, the improvement which comprises:

incorporating in the padding liquor or print paste a natural thickening agent derived from a polysaccharide of nonionic or anionic type, the viscosity of a 1% strength aqueous solution of which is from 0.05 to 20 Pas, and

setting the pH of the padding liquor or print paste containing the thickening agents at a value of 1.2 to 4.5,

whereby the electrolyte sensitivity of the synthetic thickening agent in an acidic medium is substantially decreased.

4,502,868

COAL-WATER SLURRIES OF LOW VISCOSITY AND METHOD FOR THEIR PREPARATION

Farrokh Yaghmaie, Wappinger Falls, and Ronald J. Mc Keon, Beacon, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Sep. 27, 1982, Ser. No. 423,939

Int. Cl.[3] C10L *1/32*

U.S. Cl. 44—51 13 Claims

1. A comminuted solid fuel-water slurry having improved pumpability properties which comprises from about 50 to about 70 weight percent of a smaller than 60 mesh comminuted fuel, from about 50 to 30 weight percent water and from about 0.01 to about 5.0 weight percent of a surfactant comprising a sulfonation product of humic acids in which said surfactant is prepared by grinding organic material bearing humic acids to at least 60 mesh size; neutralizing said humic acids with a base to form a reaction mixture and contacting said reaction mixture

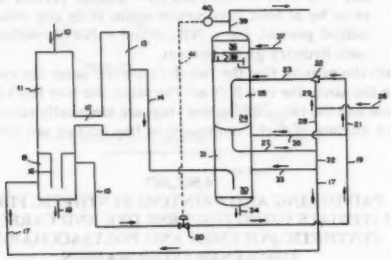
with sulfur dioxide under sulfonation conditions until a substantial part of the humic acids contents of said reaction mixture is sulfonated to form said surfactant.

4,502,869

SYNTHESIS GAS GENERATION PROCESS WITH CONTROL OF RATIO OF STEAM TO DRY GAS

Frederick C. Jahnke, Rye; William B. Crouch, Chappaqua, both of N.Y., and George M. Gulko, Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 5, 1983, Ser. No. 510,488
Int. Cl.³ C10J *3/46*
U.S. Cl. 48—197 R **11 Claims**



1. The method which comprises

partially oxidizing a carbon-containing charge fuel in the presence of temperature moderator and an oxygen-containing gas thereby forming a hot synthesis gas containing carbon monoxide and hydrogen;

cooling a first portion of said hot synthesis gas by indirect heat exchange thereby forming a partially cooled first portion of said hot synthesis gas;

contacting a second portion of said hot synthesis gas, with a body of aqueous liquid in a quench operation thereby forming a partially cooled second portion of said hot synthesis gas;

scrubbing said partially cooled first portion of said hot synthesis gas with aqueous scrubbing liquor in a first scrubbing operation thereby forming a further cooled first portion of said hot synthesis gas;

scrubbing said further cooled first portion of said hot synthesis gas and said partially cooled second portion of said synthesis gas in a second scrubbing operation in contact with aqueous liquor thereby forming a final product synthesis gas having a predetermined mole ratio of steam to dry gas;

withdrawing said final product synthesis gas having a predetermined mole ratio of steam to dry gas as a final product stream; and

controlling the flow of said partially cooled second portion of said hot synthesis gas to said second scrubbing operation in accordance with the temperature or flow of said final product synthesis gas exiting said second scrubbing operation thereby maintaining the predetermined mole ratio of steam to dry gas in said final product synthesis gas.

4,502,870

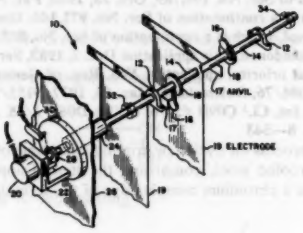
METHOD AND APPARATUS FOR CONTROLLING TUMBLING HAMMER RAPPER FOR ELECTROSTATIC PRECIPITATOR

Harry L. Wheeler, Birmingham, Ala., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 21, 1983, Ser. No. 477,103
Int. Cl.³ B03C *3/76*
U.S. Cl. 55—13 **11 Claims**

1. In an electrical precipitator having electrically chargable electrodes, each having an anvil, for electrostatically removing particulate matter from a particulate entrained gas stream passing therethrough and a rapper shaft proximate the anvils having rapper means for striking the anvils thereby causing the electrodes to vibrate so as to disengage particulate matter deposited thereon, a method of controlling the rotation of the rapper shaft, comprising:

a. sensing the initial position of the rapper shaft;



b. initiating rotation of the rapper shaft;

c. sensing the rotation of the rapper shaft from the initial position; and

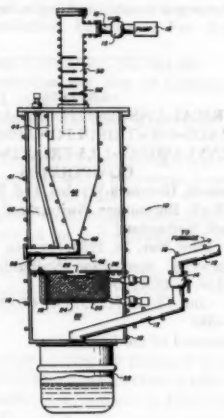
d. stopping the rapper shaft rotation upon completion of one revolution.

4,502,871

APPARATUS AND METHOD FOR SEPARATING WAX FROM AN ENTRAINER GAS

Ingar F. Andersen, Bow/Concord, N.H.; Timothy W. Lutts, Salem, and Eddie W. Lam, Newton, both of Mass., assignors to GCA Corporation, Bedford, Mass.

Filed Feb. 1, 1983, Ser. No. 462,600
Int. Cl.³ B01D *50/00, 8/00*
U.S. Cl. 55—82 **25 Claims**



1. An apparatus for separating wax, which is any substance used as a binder and/or a lubricant, from an entrainer gas which is drawn by a pump into the apparatus comprising:

a hot chamber into which the entrainer gas is drawn through an entrainer gas inlet in said hot chamber;

a heated filter positioned in said hot chamber, said heated filter being located adjacent an aperture in a wall of said hot chamber, said aperture providing an outlet for said entrainer gas from said hot chamber;

means for heating said hot chamber and said heated filter;

means for drawing the entrainer gas through said apparatus;

a cold chamber positioned adjacent said wall of said hot chamber which includes said aperture, said wall forming a

barrier between said hot chamber and said cold chamber, and said aperture being a flow-restricting aperture which caused a pressure drop as said entrainer gas passes through said aperture, said pressure drop resulting in an expansion of said entrainer gas thereby cooling said wax into solid particles in said cold chamber;

means for maintaining a low temperature in said cold chamber;

cold chamber separating means for further separating wax from the entrainer gas;

outlet means for allowing the entrainer gas to escape the apparatus;

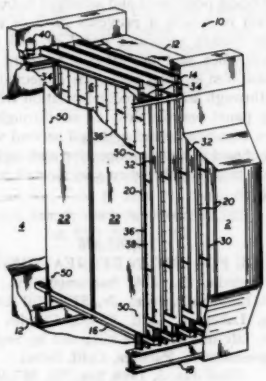
whereby when said entrainer gas passes through said heated filter a portion of said wax is removed from the entrainer gas by said filter before said entrainer gas enters said cold chamber.

4,502,872

DISCHARGE ELECTRODE WIRE ASSEMBLY FOR ELECTROSTATIC PRECIPITATOR

Frank D. Ivester, Alabaster, and James R. Troulias, Birmingham, both of Ala., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 31, 1983, Ser. No. 480,971
Int. Cl.³ B03C 3/08, 3/40
U.S. Cl. 55—147 **5 Claims**



1. An electrostatic precipitator comprising:

a. a casing having a gas inlet and a gas outlet for conveying a horizontal flow of gas to be cleaned;

b. a collecting electrode assembly disposed within the casing between the gas inlet and the gas outlet, said collecting electrode assembly comprised of a plurality of collecting electrode plates disposed parallel to the gas flow direction through the casing and arranged in spaced planes;

c. a discharge electrode assembly to which a voltage is applied to generate an electrostatic field comprised of a plurality of discharge electrode frames disposed parallel to and alternately intermediate between said collecting electrode plates and a plurality of discharge electrode wires tautly strung parallel to each other at spaced intervals within each of said discharge electrode frames; and

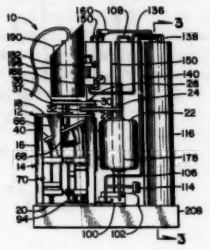
d. tensioning means positioned and arranged with respect to said discharge electrode wires for maintaining the discharge electrode wires in a taut condition, said tensioning means constructed so as to take up any loosening of the discharge electrode wires in a direction perpendicular to the discharge electrode wires.

4,502,873

METHOD AND APPARATUS FOR CONCENTRATING OXYGEN

William R. Mottram, Boulder; Gene A. Fisher, Lafayette, and Louis Feierabend, Boulder, all of Colo., assignors to Proto-Med, Inc., Boulder, Colo.

Filed Jul. 27, 1982, Ser. No. 402,270
Int. Cl.³ B01D 53/04
U.S. Cl. 55—179 **3 Claims**



1. In apparatus for producing oxygen enriched gas, including a plurality of zeolitic molecular sieve beds adapted for selectively adsorbing nitrogen at higher pressure and oxygen at lower pressure, wherein said apparatus operates in continuing repetitious cycles of a first phase wherein air is injected under pressure into one zeolitic molecular sieve bed to adsorb nitrogen at the injection end of said one bed and to concentrate oxygen at the discharge end of said one bed while discharging oxygen enriched gas at least partially into the discharge end and bleeding pressure from the injection end of another of said beds and a second phase wherein air is injected under pressure into said other bed to adsorb nitrogen at the injection end of said other bed and to concentrate oxygen at the discharge end of said other bed while discharging oxygen enriched gas at least partially into the discharge end and bleeding pressure from the injection end of said other bed, the improvement comprising:

automatic variable displacement compressor means for compressing air to a predetermined upper pressure limit and delivering the compressed air to said zeolitic molecular sieve beds, said compressor means including a reciprocating piston type compressor having an elongated cylindrical chamber, a piston slidably positioned in said chamber for compressing air, and a piston rod attached to said piston and extending upwardly out of said chamber for reciprocating said piston;

swash plate drive means for reciprocating said piston, said swash plate drive means including a circular disk-shaped inner plate member having a hole axially through the center thereof, a disk-shaped outer ring member with a hole axially therethrough of a radius approximately the same as the radius of said plate member slidably mounted concentrically around the peripheral surface of said inner plate member in such a manner that said inner plate member and said outer ring member are laterally immovable in relation to each other while said inner plate member is rotatable inside said outer ring member, a drive shaft extending into said hole in said inner plate member, pivotal mounting means for mounting said inner plate member pivotally to said main shaft in such a manner that said inner plate member and outer ring member are pivotal from a right angle to a range of acute angles in relation to said drive shaft, and a spring connected between said drive shaft and said inner plate member for biasing said inner plate member and said outer ring member to an acute angle in relation to said drive shaft, said piston rod being connected to said outer ring member.

4,502,874

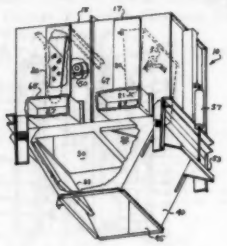
CONTINUOUS FILTRATION

Lewis A. Levie, and Max J. Fowler, both of Charlotte, N.C., assignors to Pneumafil Corporation, Charlotte, N.C.

Filed Oct. 8, 1982, Ser. No. 433,374

Int. Cl.[3] B01D *46/04, 35/12*

U.S. Cl. 55—283 3 Claims



1. A fiber collector for continuously extracting and collecting fibers from the air handling system in a textile mill, said collector comprising:

a plurality of contiguous alternately employable filter compartments, each having an air inlet and air outlet, and a discharge opening;

a screen filter in each compartment between the air inlet and air outlet;

a common air supply duct having an air inlet end and air outlet end, said duct carrying the fiber laden air to the outlet end of said duct;

branch air supply ducts extending from said common air supply duct, one to the air inlet of each filter compartment;

a diverting vane between said common air supply duct and said branch ducts selectively positionable to feed air from the common duct to one or another of said branch air supply ducts;

a sensor in each filter compartment, sensing the clogging condition of said filter;

a coupling between said sensor and said diverting vane to change the position of said diverting vane upon sensing of the filter clogging condition;

a branch air discharge duct extending from the air outlet of each compartment to a common air discharge duct;

a common hopper arranged beneath the discharge openings of all said filter compartments;

a selectively openable door positioned over the discharge opening of each compartment; and

vibrator filter cleaning means in each compartment actuated by said sensor.

4,502,875

AIR INTAKES OF AIRCRAFT MOUNTED GAS TURBINE ENGINES

John R. Ballard, Sarrett, England, assignor to Rolls-Royce Limited, London, England

Filed Nov. 16, 1983, Ser. No. 552,422

Claims priority, application United Kingdom, Dec. 23, 1982, 8236595

Int. Cl.[3] B64C *23/00;* B01D *45/16*

U.S. Cl. 55—306 2 Claims

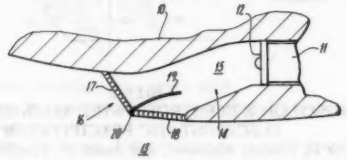
1. In combination with an aircraft having at least one gas turbine engine and capable of hover and forward flight conditions, the improvement in an air intake system for the gas turbine engine comprising:

a duct interconnecting an air inlet of said gas turbine engine with an exterior of said aircraft, said duct having a single first forwardly facing air inlet portion for receiving ram air therethrough during forward flight condition as well as air therethrough during hover flight condition and a single second immediately adjacent sideways facing air inlet portion for receiving air therethrough only during hover flight condition, said second air inlet portion being angularly disposed relative to said first air inlet portion;

a vortex separator panel extending across said first air inlet portion for separating debris from air passing therethrough;

a second vortex separator panel extending across said second air inlet portion for separating debris from air passing therethrough, said second vortex separator panel abutting and being angularly disposed with respect to said first vortex separator panel;

and an obturating panel having an upstream end freely pivotally connected between said forwardly facing first air inlet



portion and said second immediately adjacent sideways facing air inlet portion, said obturating panel being on a downstream side of both said first vortex separator panel and said second vortex separator panel, said obturating panel being positioned and arranged to be moved to a first position in which it prevents flow of air through said second vortex separator panel of said second air inlet portion when said aircraft is in forward flight condition and said first air inlet portion is subjected to ram air flow therethrough and to a second position wherein said obturating panel permits flow of air through both said first vortex separator panel and said second vortex separator panel of said first air inlet portion and said second air inlet portion respectively when said aircraft is in hover flight condition.

4,502,876

CARTRIDGE FOR USE IN REBREATHING APPARATUS

Albert R. Behnke, Jr., 2241 Sacramento St., San Francisco, Calif. 94115; John P. Jones, Jr., 5106 Hill Rd., Lake Medical Building, Lakeport, Calif. 95453; Charles E. Michielsen, deceased, late of Pacifica, Calif., and by Sophie Michielsen, legal representative, Pacifica, Calif. 94044

Filed Jan. 3, 1984, Ser. No. 567,683

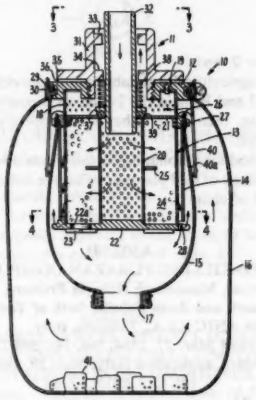
Int. Cl.[3] B01D *53/04*

U.S. Cl. 55—387 9 Claims

1. A cartridge for use in rebreathing apparatus comprising: a first flexible container; a second flexible container disposed within said first and in fluid communication therewith through a restricted opening; a filter containing CO_2 absorbent within said second flexible container; first conduit means for passing exhaled gas through said filter and into said second container; and second conduit means for withdrawing gas from said first flexible container; whereby CO_2 is removed from exhaled gases passing through said filter, said first and second flexible containers increasing the retention time for processing exhaled gases for rebreathing to enhance cooling and moisture removal.

6. A replaceable cartridge for use in rebreathing apparatus comprising: a mounting flange having an opening therethrough; a first flexible container mounted to said flange peripherally of said opening; a perforated sleeve mounted to said flange within said first flexible container; a perforated core mounted within said perforated sleeve; a pair of end walls, an upper end wall mounted within the upper end of said sleeve and having a central opening in fluid communication with the upper end of said perforated core, the other end wall closing

off the lower end of said sleeve and said core; discrete particles of CO_2 absorbent material disposed within the space defined by the interior surface of said sleeve, the exterior surface of said core and between said pair of end walls; a metallic shield disposed about said perforated sleeve and in spaced relation thereto; a second flexible container disposed within said first



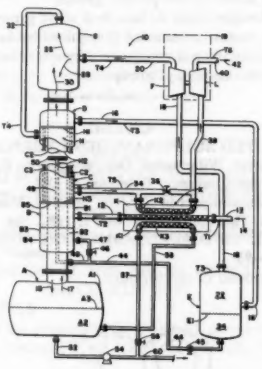
flexible container, the upper end thereof being connected to the upper end wall of said filter, the lower end being in fluid communication with the first flexible container through a restricted opening, said second flexible container substantially enclosing said filter and capable of expanding and contracting independently of said first flexible container.

4,502,877

COMBINATION COUNTERFLOW HEAT EXCHANGER AND FRACTIONATING TOWER

Kenneth H. Bacon, Sr., 5398 E. 26th Pl., Tulsa, Okla. 74114

Filed Jun. 9, 1983, Ser. No. 502,742
Int. Cl.³ B01D *3/14*
U.S. Cl. 62—42 **5 Claims**



1. In a system for separating higher boiling hydrocarbon products from methane in a gas liquid extraction plant, said plant having at least heat exchanger means (HEM) and fractionating tower means (FTM), the improved construction of a combined fractionater/heat exchanger means for more completely and efficiently separating the methane from higher boiling components, comprising:

(a) said fractionating tower means having a cylindrical outer wall with vertical axis, and means to impress on its outer wall a linearly varying temperature, or uniform temperature gradient, from top to bottom;

(b) said means to impress said uniform temperature gradient comprising counterflow heat exchanger means (HEM) constructed in the form of an annular chamber, with the inner wall of said HEM being the same tube as the outer wall of said FTM;

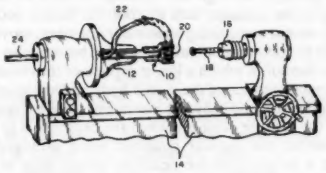
said HEM being designed to provide said uniform temperature gradient produced therein and applied in the inner wall thereof, which becomes the source of the uniform temperature gradient in the FTM; and this combination of FTM and HEM provides as a single monolithic structure, the temperature control necessary to produce the efficient gas separation desired.

4,502,878

TUBULATING DEVICE AND METHOD OF TUBULATION

Edwin D. Smith, Dutch Mill Rd., Malaga, N.J. 08328

Filed Apr. 5, 1984, Ser. No. 597,033
Int. Cl.³ C03B *23/207*
U.S. Cl. 65—36 **13 Claims**



1. An apparatus for glass tubulating to a glass barrel having at least one opening comprising:

(a) a tube of sufficient size to receive tubing already welded to the glass barrel,

(b) a holding means attached to the tube to hold the barrel in a position to expose the area of the barrel to which a tubing of glass is to be sealed,

(c) a pressing means on the holding means to hermetically seal all the openings in the barrel, and

(d) a pressure source means in pressure communication with the interior of the barrel to provide pressure sufficient to blow out a hole in the barrel.

10. A method to weld glass tubing to and open into the side of a glass barrel having two open ends comprising:

(a) holding a piece of glass tubing in a glass lathe chuck,

(b) holding a barrel holding means in a second opposing chuck, the holding means to hold the barrel and to align the exposed end of the tubing with a point on the barrel at which the tubing is to be attached,

(c) hermetically sealing off both ends of the barrel and any other openings to the barrel,

(d) spinning both chucks in the same direction synchronously,

(e) heating the end of the tubing and the point on the barrel,

(f) inducing pressure inside the barrel sufficient to blow a hole out at the point on the barrel,

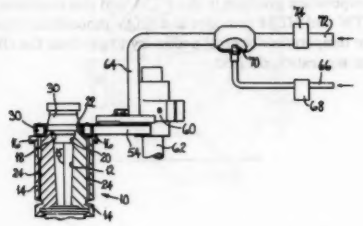
(g) contacting the heated end of the tube with the barrel at the point of the hole, and

(h) maintaining pressure in the barrel until the glass cools.

4,502,879
MOULD COOLING ARRANGEMENT FOR A GLASSWARE FORMING MACHINE

Thomas V. Foster, Doncaster, England, assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Mar. 15, 1984, Ser. No. 589,916
Claims priority, application United Kingdom, Apr. 8, 1983, 8309672
Int. Cl.³ C03B 9/38
U.S. Cl. 65—267 **9 Claims**



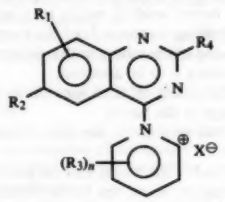
1. A mould arrangement for use in a cyclicly operating glassware forming machine, the arrangement comprising a mould body defining a mould cavity in which molten glass can be moulded, the mould cavity having an upwardly facing opening, cooling passages extending vertically in the mould body and each having an opening in an upper surface of the mould body which extends around the opening of the mould cavity, and air delivery means operable to deliver cooling air to said passages through the openings thereof so that the air flowing in the passages acts to cool the mould body, the air delivery means comprising an annular chamber, moving means operable to move the annular chamber between an operative position thereof in which a lower surface of the chamber overlies the upper surface of the mould body and an out-of-the-way position thereof, and blowing means operable to blow cooling air into the annular chamber when the chamber is in its operative position, the annular chamber being arranged so that, when it is in its operative position, access may be obtained through the centre of the annular chamber to the opening of the mould cavity, the chamber having openings in its lower surface which, when the chamber is in its operative position, each communicate with an opening of one of the cooling passages so that air blown into the annular chamber passes through the openings into the cooling passages.

4,502,880
4-PYRIDINIUM QUINAZOLINE DERIVATIVES

Caleb W. Holyoke, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 3, 1983, Ser. No. 463,473
Int. Cl.³ A01N 9/22; C07D 401/14
U.S. Cl. 71—74 **24 Claims**

1. A compound of the formula:

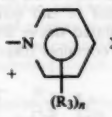


where

R_1 and R_2 are independently H, F, Cl, Br, or C_1–C_4 alkyl;

R_3 is C_1–C_4 alkyl;

R_4 is Cl or



n is 0, 1 or 2; and

$X^{\ominus}$ is an agriculturally suitable anion; provided that when n is 1 or 2 and R_3 is in the 2- and/or 6-position of the pyridine ring, then R_3 is other than isopropyl, sec-butyl or tert-butyl.

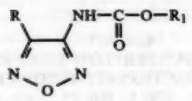
17. A method for defoliating cotton plants comprising applying to the foliage of said plants an effective defoliant amount of a compound of claim 1.

4,502,881
WEED-KILLING FURAZAN COMPOUNDS

Renato Francese, Moncalieri; Roberta Fruttero, Sabiliano; Vittorio Messori, and Anna Peluffo, both of Turin, all of Italy, assignors to ANIC S.p.A., Palermo, Italy

Filed Mar. 27, 1984, Ser. No. 593,772
Claims priority, application Italy, Mar. 29, 1983, 20341 A/83
Int. Cl.³ A01N 43/82
U.S. Cl. 71—92 **3 Claims**

1. A method of controlling the growth of weeds, before or after the emergence of a crop, characterised in that the infested land is treated with an effective quantity of at least one herbicidal compound chosen from those defined by the following general formula:



(I)

where

R is a straight-chain or branched alkyl group with 1 to 6 carbon atoms or the phenyl group,

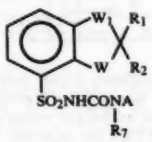
R_1 is a straight-chain or banched alkyl group with 1 to 10 carbon atoms (substituted if required by halide or phenyl group), an alkenyl group, an alkynyl group, a cycloalkyl group, or the phenyl group.

4,502,882
SUBSTITUTED SULFONAMIDES 1,3-BENZODIOXOLE

Linda G. Carter, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 363,379, Mar. 29, 1982, abandoned. This application Nov. 1, 1982, Ser. No. 437,366
Int. Cl.³ C07D 405/12; A01N 43/70, 43/68, 43/66
U.S. Cl. 71—93 **14 Claims**

1. A compound of the formula:



I

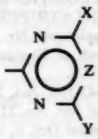
wherein

W is O;

W_1 is O;

R_1 is H or CH_3;

R_2 is H or C_1–C_4 alkyl;
R_7 is H or CH_3;
A is



X is CH_3, OCH_3 or Cl;
Y is C_2H_5, CH_3, OCH_3, OC_2H_5, CH_2OCH_3, NH_2, $NHCH_3$, SCH_3, $N(CH_3)_2$, $CH(OCH_3)_2$ or CH; and
Z is N;
and their agriculturally suitable salts.

12. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

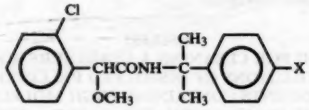
4,502,883

N-(α,α-DIALKYLBENZYL)-PHENYLACETAMIDE COMPOUNDS AND HERBICIDAL COMPOSITIONS CONTAINING SAID COMPOUNDS

Tetsuo Takematsu; Nobuyuki Kikkawa, both of Utsunomiya, and Hideaki Ogawa, Sodegaura, all of Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Division of Ser. No. 118,746, Feb. 5, 1980, abandoned. This application Mar. 24, 1982, Ser. No. 361,561
Claims priority, application Japan, Feb. 7, 1979, 54-12211
Int. Cl.³ A01N *37/18*; C07C *103/26*
U.S. Cl. 71—118 **6 Claims**

1. N-(α,α-dimethylbenzyl)-phenylacetamide compounds having the general formula



wherein X is a chlorine atom or a bromine atom.

4. A herbicidal composition comprising (i) an inert herbicidal carrier, and (ii) a herbicidally effective amount of at least one compound as defined in claim 1.

4,502,884

METHOD FOR PRODUCING FIBER-SHAPED TANTALUM POWDER AND THE POWDER PRODUCED THEREBY

James A. Fife, Douglassville, Pa., assignor to Cabot Corporation, Boston, Mass.

Filed Oct. 27, 1983, Ser. No. 545,862
Int. Cl.³ B22F *9/00*
U.S. Cl. 75—0.5 AB **10 Claims**

1. A method for producing fiber-shaped powder from suitable metals of Groups IV, V, VI of the Periodic Table comprising:

forming a composite of said metal powder particles and an auxiliary metal by powder metallurgical techniques,

working said metal/auxiliary metal composite by mechanical deformation until said metal particles are deformed into fiber shapes within a matrix of the auxiliary metal,

removing said auxiliary metal from said matrix by treatment with a mineral acid suitable to dissolve the auxiliary metal, and

recovering the fiber-shaped metal powder.

4,502,885

METHOD FOR MAKING METAL POWDER

Richard F. Cheney, Athens, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Apr. 9, 1984, Ser. No. 598,134
Int. Cl.³ B22F *9/00*
U.S. Cl. 75—0.5 B **1 Claim**

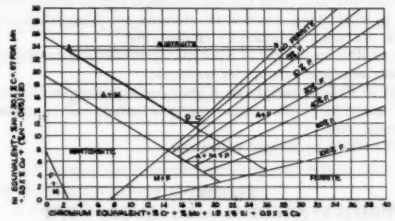
1. A process for preparing a rapidly solidified powder comprising entraining an agglomerated metal powder in a carrier gas, feeding the entrained agglomerated powder through a high temperature reactor to form a stream of dispersed particles, one portion of said dispersed particles being substantially completely melted and another portion being partially melted, directing said stream of dispersed particles into a cooling fluid at a temperature sufficient to subject said particles to conditions of rapid solidification and form an initial mixture of particles comprising rapidly solidified spherically shaped particles from said one portion and partially resolidified particles from said other portion, said rapidly solidified spherically shaped particles requiring a first amount of energy for comminution and said partially resolidified particles requiring a second amount of energy for comminution, said second amount of energy being less than said first amount of energy, subjecting said mixture to an energy for comminution intermediate said first and second energy for preferentially comminuting said other portion as compared with said one portion to give a resulting mixture containing comminuted particles, and separating a portion of said comminuted particles to give a final mixture including a greater proportion of rapidly solidifed spherically shaped particles than said initial mixture.

4,502,886

AUSTENITIC STAINLESS STEEL AND DRILL COLLAR

James N. Cordea, Monroe; Joseph C. Jasper, Middletown, both of Ohio, and Harshad V. Sheth, Rancho Palos Verdes, Calif., assignors to Armco Inc., Middletown, Ohio

Filed Jan. 6, 1983, Ser. No. 455,990
Int. Cl.³ C22C *38/58*
U.S. Cl. 75—125 **23 Claims**



1. An austenitic stainless steel having a 0.2% yield strength of at least 85 ksi, a stress corrosion resistance of greater than 1,000 hours under stress of 25 ksi in boiling 42% magnesium chloride solution, and a reduction of area of at least about 50% in the hot worked condition, and a magnetic permeability not greater than 1.004 at 500 oersteds in the cold worked condition, said steel consisting essentially of, in weight percent, from 0.12% to about 0.20% carbon, 11% to about 14% manganese, about 0.80% maximum silicon, about 0.04% maximum phosphorus, about 0.025% maximum sulfur, about 16% to about 19% chromium, about 1.5% to 2.7% nickel, 0.30% to 0.45% nitrogen, about 0.7% to about 0.9% copper, about 0.75% maximum molybdenum, and balance essentially iron, with the carbon:nitrogen ratio being not greater than about 0.6:1.

4,502,887

UNDERWATER CONCRETING CEMENT COMPOSITION

Kenji Tsuda, Himeji, Japan, assignor to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Dec. 30, 1983, Ser. No. 567,025
Claims priority, application Japan, Jan. 19, 1983, 58-6895
Int. Cl.³ C04B 7/353
U.S. Cl. 106—93 6 Claims

1. An underwater concreting cement composition comprising 100 parts by weight of hydraulic cement, mixed with (a) 0.2 to 2.0 parts by weight of hydroxyethylcellulose and (b) 0.01 to 0.2 part by weight of high-molecular weight polyethylene oxide and/or 0.2 to 4.0 parts by weight of calcium formate.

4,502,888

AQUEOUS DISPERSIONS OF PLASTICIZED POLYMER PARTICLES

Douglas E. Leng; Wilmer L. Sigelko, and Frank L. Saunders, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 13, 1982, Ser. No. 449,297
Int. Cl.³ C08L 1/08, 27/00
U.S. Cl. 106—170 26 Claims

1. A dispersion of plasticized polymeric particles comprising:

(a) a continuous aqueous phase having dispersed therein

(b) a plurality of particles, which particles comprise

(1) a water-insoluble thermoplastic cellulose ether polymer and

(2) a plasticizing composition which is compatible with and plasticizes said cellulose ether polymer, said plasticizing composition comprising an amount of a water-soluble salt of a fatty acid sufficient to stabilize the dispersion, said fatty acid being one which is a plasticizer for the cellulose ether polymer.

4,502,889

SILICONE EMULSION COMPOSITIONS

Akitsugu Kurita, Ohta, Japan, assignor to Toshiba Silicone Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1983, Ser. No. 562,801
Claims priority, application Japan, Dec. 21, 1982, 57-227375
Int. Cl.³ C09K 3/00
U.S. Cl. 106—287.12 6 Claims

1. A colloidal silica free silicone emulsion composition comprising a reinforcing amount of alumina sol blended in an emulsion precursor obtained by emulsifying:

(A) 1 to 80% by weight of a polydiorganosiloxane having at least one silanol group per molecule,

(B) 0.1 to 20% by weight of at least one nonionic surfactant or quaternary ammonium salt surfactant or mixtures thereof, and

(C) 15 to 95% by weight of water.

4,502,890

PURIFICATION OF SUGAR LIQUORS WITH ACTIVATED CARBON

John E. Urbanic, Pittsburgh, Pa., assignor to Calgon Carbon Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 239,836, Mar. 2, 1981, abandoned. This application Nov. 8, 1982, Ser. No. 439,980
Int. Cl.³ C13D 3/14
U.S. Cl. 127—46.2 2 Claims

1. In the method of purifying and decolorizing starch hydrolysate which comprises contacting said starch hydrolysate with a sufficient amount of activated carbon to decolorize and to adsorb oligosaccharides containing 3 or more saccharide groups, maintaining said contact for a period of time sufficient to accomplish substantially complete adsorption of color causing impurities and said oligosaccharides;

the improvement comprising:

passing said starch hydrolysate into contact with said granular activated carbon at a flow rate of 1.0 to 3.0 gallons per minute/ft², wherein said granular activated carbon has an iodine number of at least 1,200 and an average particle diameter in the range of 0.4 mm to 4.0 mm.

4,502,891

DRY POWDER COMPOSITIONS FOR PREPARING POINT STRIPPERS

Peter Brocklehurst, Chappletown, Nr. Sheffield, and Angus S. Ferguson, Sheffield, both of England, assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 343,156, Jan. 27, 1982, , which is a continuation-in-part of Ser. No. 212,079, Dec. 1, 1980, abandoned. This application Oct. 6, 1983, Ser. No. 539,456
Claims priority, application United Kingdom, Feb. 12, 1981, 8104467
Int. Cl.³ C11D 3/14, 7/06; B08B 7/00
U.S. Cl. 134—4 12 Claims

1. A composition in dry powder form which can be mixed with water to form a spreadable aqueous paint stripper, which comprises calcium hydroxide and an alkali metal salt, the anion of the alkali metal salt being one which forms a water-insoluble salt with calcium, to thereby provide alkali in an amount such that the aqueous stripper is capable of stripping paint, together with one or more skin forming promoter components comprising either a natural or synthetic water-soluble polymer as a gelling agent in combination with a filler, or a fibrous material in the form of relatively short individual fibers whereby, when the aqueous stripper is applied as a layer over a painted surface to be stripped, it forms over the surface a peelable skin, the skin having a tear strength sufficient for it to be separated and removed from the underlying surface and an adhesive strength sufficient to separate and remove the underlying surface paint softened by contact with the composition.

10. A method of stripping a paint layer from an underlying surface which comprises applying to the paint layer an effective amount of a composition as claimed in claim 1, allowing the composition to form a peelable skin in conjunction with paint softened by the action of the composition, lifting the formed skin and peeling it away from the underlying surface to strip the paint therefrom.

4,502,892

METHOD FOR CLEANING A GLASS SURFACE WITH SOLUTIONS OF DISSOLVED PELLETED COMPONENTS CONTAINING HIGH MOLECULAR WEIGHT POLYPHOSPHATES, CARBONATES AND ACID-FORMING SUBSTANCES

Lothar Westermann, Cologne; Horst-Dieter Wasel-Nielen, and Günter Sorbe, both of Hürth, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 104,539, Dec. 17, 1979, abandoned. This application Jul. 13, 1983, Ser. No. 504,834
Claims priority, application Fed. Rep. of Germany, Dec. 27, 1978, 2856143
Int. Cl.³ B60S 1/04, 1/48; C11D 3/065, 17/00
U.S. Cl. 134—6 15 Claims

1. A method for cleaning the windshields of motor vehicles by means of a windshield washer mechanism, comprising the steps of:

dissolving in an aqueous medium in said windshield washer mechanism at least one solid pellet comprising the following pelleted components:

(a) a water-soluble alkali metal polyphosphate of high molecular weight with a P_2O_5-content of 60 to 70 weight % in a proportion of 10 to 90 weight %;

(b) at least one alkali metal carbonate or hydrogen-carbonate in a proportion of 2.5 to 35 weight %;

(c) at least one crystalline substance producing an acid reaction in aqueous solution in a proportion of 2.5 to 35 weight %;

(d) at least one anion-active and/or non-ionic surfactant in a proportion of 1 to 20 weight %; and

(e) at least one filler selected from the group consisting of low molecular alkali metal phosphates and alkali metal sulfate in a proportion of 5 to 15 weight %,

thereby obtaining an aqueous glass cleaning composition, and

cleaning the windshield with the resulting aqueous glass cleaning composition.

4. A method according to claim 1, comprising the steps of:

dissolving at least one solid pellet in a sufficient amount of aqueous medium to provide a concentration of the dissolved pelleted components which is effective for cleaning glass but does not exceed 50 grams per liter of aqueous medium, and obtaining an aqueous cleaning solution substantially free of turbidity and precipitated solids,

pumping the resulting aqueous cleaning solution through a windshield washer mechanism onto the glass surface of the windshield, and

wiping the aqueous cleaning solution thus applied to the windshield from the glass surface of the windshield with the aid of a windshield wiper.

4,502,893

METHOD FOR CLEANING ROOT CROPS IN THE FIELD

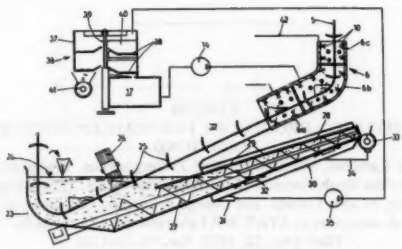
Martin Dietrich, Paternoster 5, 8851 Mertingen (BRD), Fed. Rep. of Germany

Division of Ser. No. 188,363, Sep. 18, 1980, Pat. No. 4,355,433. This application Apr. 16, 1982, Ser. No. 369,164

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1979, 2938439

Int. Cl.³ B08B *3/00*

U.S. Cl. 134—10 **5 Claims**



1. A method for cleaning root crops in the field comprising the sequential steps, undertaken in the field, of:

harvesting the roots;

cutting vegetable waste matter from the roots;

crushing the vegetable waste matter;

extracting sap from the vegetable waste matter;

mixing the sap with cleaning agent to form a liquid cleaning agent at least part of which is essentially comprised of said sap and the remaining part of which is water;

soaking the roots in a liquid bath to soften adhering dirt;

washing the roots by spraying them with continuous pressure jets dispensing the liquid cleaning agent at a pressure sufficient to loosen and removed adhering dirt and debris; and

drying the roots by means of jets dispensing air.

4,502,894

METHOD OF FABRICATING POLYCRYSTALLINE SILICON RESISTORS IN INTEGRATED CIRCUIT STRUCTURES USING OUTDIFFUSION

John Y. W. Seto, and Ken K. Y. Su, both of San Jose, Calif., assignors to Fairchild Camera & Instrument Corporation, Mountain View, Calif.

Filed Aug. 12, 1983, Ser. No. 522,934

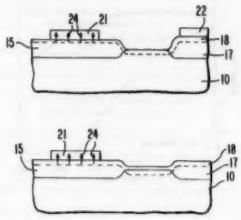
Int. Cl.³ H01L *21/20;* **B01J** *17/00*

U.S. Cl. 148—1.5 **8 Claims**

1. A method of fabricating a polycrystalline silicon resistor in a semiconductor structure while doping first regions in the semiconductor structure comprising:

fabricating insulating material of first thickness over the first regions and of second greater thickness over second regions of the semiconductor structure;

introducing at least one desired conductivity type dopant into the insulating material at the second regions, and at the same time through the insulating material into the semiconductor structure at the first regions;



forming regions of undoped polycrystalline silicon on the insulating material of second greater thickness; and

treating the semiconductor structure, including the regions of undoped polycrystalline silicon, to cause the dopant in the insulating material to diffuse into the polycrystalline silicon to thereby fabricate a polycrystalline silicon resistor.

4,502,895

PROCESS FOR MAKING BRASS-PLATED LONG-SIZE ARTICLES

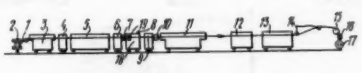
Alexandr V. Trubitsyn; Georgy M. Fomin; Ivan N. Nedovizy; Pavel E. Petrov; Petr I. Denisov; Sergei A. Tulupov; Stepan T. Chursin; Vladimir N. Kuptsynov; Adolf K. Merkulov, and Lev G. Stobbe, all of Magnitogorsk, U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky Institut Metiznoi Promyshlennosti, Magnitogorsk, U.S.S.R.

PCT No. PCT/SU80/00125, § 371 Date Mar. 23, 1982, § 102(e) Date Mar. 23, 1982, PCT Pub. No. WO82/00479, PCT Pub. Date Feb. 18, 1982

PCT Filed Jul. 31, 1980, Ser. No. 364,846

Int. Cl.³ C25D *7/06, 5/36, 3/66*

U.S. Cl. 148—11.5 Q **11 Claims**



1. A process for brass-plating a long-size article, such as wire or the like, comprising the steps of:

a. degreasing and etching the surface of a long-size article by immersion in a first bath of molten inorganic salts;

b. coating the degreased and etched article with a layer of copper by immersion in a bath comprising an acidic solution of copper sulfate;

c. electrolytically coating the copper coated article with a layer of zinc by immersion in an electrolytic bath which comprises zinc;

d. thermodiffusively treating and tempering the article by immersion in a second bath of molten inorganic salts, which salts have been heated to a temperature which does not exceed the temperature of recrystallization of said article by more than about 50° C., said treating causing at least some of the copper and at least some of the zinc to alloy, thereby forming brass; and

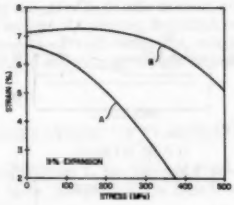
e. straightening the article, by passing said article through a straightening means.

4,502,896

METHOD OF PROCESSING BETA-PHASE NICKEL/TITANIUM-BASE ALLOYS AND ARTICLES PRODUCED THEREFROM

Tom Duerig, Fremont, and Keith Melton, Cupertino, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Apr. 4, 1984, Ser. No. 596,771
Int. Cl.³ C22F 1/10
U.S. Cl. 148—11.5 F **22 Claims**



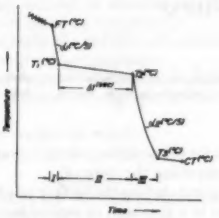
1. A method for processing a beta-phase nickel/titanium-base alloy comprising: warm working the alloy; wherein the working temperature is in a range such that the lower limit is where the material has sufficient ductility and enough dynamic recovery occurs to prevent excessive work hardening on successive passes and the upper limit is the temperature above which recrystallization occurs.

4,502,897

METHOD FOR PRODUCING HOT-ROLLED STEEL SHEETS HAVING A LOW YIELD RATIO AND A HIGH TENSILE STRENGTH DUE TO DUAL PHASE STRUCTURE

Masahiko Morita; Junichi Mano; Minoru Nishida; Tomoo Tanaka; Nobuo Aoyagi, and Syoichi Takizawa, all of Kurashiki, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

PCT No. PCT/JP82/00030, § 371 Date Oct. 15, 1982, § 102(e) Date Oct. 15, 1982, PCT Pub. No. WO82/02902, PCT Pub. Date Sep. 2, 1982
PCT Filed Feb. 2, 1982, Ser. No. 438,844
Claims priority, application Japan, Feb. 20, 1981, 56-22877
Int. Cl.³ C21D 8/02
U.S. Cl. 148—12 F **2 Claims**



1. Method for producing hot-rolled steel sheets having a low yield ratio and a high tensile strength due to dual phase structure, comprising cooling a hot-rolled steel sheet containing 0.02–0.2% by weight of C, 0.05–2.0% by weight of Si, 0.5–2.0% by weight of Mn, and 0.3–1.5% by weight of Cr, and at least one element selected from each of a first group components consisting of up to 1% by weight of Cu, Ni or Mo, and 0–0.02% by weight of B, a second group component consisting of up to 0.2% by weight of Nb, V, and Ti and a third group components consisting of up to 0.05% by weight of REM and Ca, and up to 0.01% by weight of Al and up to 0.15% by weight of P, on a run-out table after final rolling and then coiling thereof, a temperature FT when the final rolling is finished, being higher than 780° C., rapidly quenching the final rolled steel sheet at a cooling rate of more than 40° C./S from the completion of the final rolling to a temperature range from a temperature T_N, shown by the following formula (1), +40° C. to the temperature T_N−40° C., holding at said temperature range for more than 5 seconds and then again rapidly quenching the steel sheet at a cooling rate of not more than 50° C./S from the held temperature to a temperature range of 550°–200° C., whereby a hot-rolled steel sheet having the yield ratio ≦65% and the parameter M of strength-elongation balance shown in the following formula (2) ≧60 and low variation of steel qualities and excellent cold formability is obtained

$$T_N = 582 + 44Si\,\% - 33Mn\,\% + 25Cr\,\% - 3Cu\,\% - \quad (1)$$

$$9Ni\,\% + 5Mo\,\% + (0.8 - C\,\%)(48 - 25Si\,\% + 57Mn\,\% -$$

$$15Cr\,\% + 10Cu\,\% - 15Ni\,\% - 28Mo\,\%) +$$

$$70\exp\left\{-\left(\frac{FT(°C.) - 780}{100}\right)^4\right\}$$

$$M = 0.45TS + El \quad (2)$$

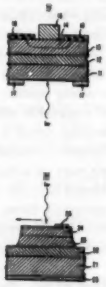
wherein TS is tensile strength (kg/mm²) and El is total elongation (%).

4,502,898

DIFFUSION PROCEDURE FOR SEMICONDUCTOR COMPOUND

Irfan Camlibel, Stirling; Howard J. Guggenheim, Bridgewater; Shobha Singh, Summit; LeGrand G. Van Uitert, Morris Township, Morris County, and George J. Zydzik, Columbia, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 21, 1983, Ser. No. 563,701
Int. Cl.³ H01L 21/225, 21/20
U.S. Cl. 148—188 **23 Claims**



1. A process for fabricating a device comprising III-V semiconducting compounds in which at least part of the III-V semiconductor compound is doped with at least one dopant substance selected from the group consisting of zinc and cadmium characterized in that the doping procedure is carried out by heat treating the III-V semiconductor compound with the inorganic fluoride of the doping substance in contact with the III-V semiconductor compound at a sufficient temperature and for sufficient time to affect doping of the III-V semiconductor compound.

4,502,899

ELECTRIC JOINT MATERIAL

Koji Tsuji, Osaka, and Shuji Yamada, Kobe, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Jun. 22, 1982, Ser. No. 390,944

Claims priority, application Japan, Jun. 30, 1981, 56-103032; Sep. 25, 1981, 56-152306

Int. Cl.³ C22C *5/06, 32/00*

U.S. Cl. 148—431 **1 Claim**

1. Joint material consisting of silver, 0.1 to 3 wt. % of lithium which is dispersed as an oxide in said silver, 0.01 to 1 wt. % of one selected from the group consisting of aluminium, calcium, magnesium and silicon which is dispersed as an oxide in said silver and 0.05 to 1 wt. % of one selected from the group consisting of iron, nickel and cobalt.

4,502,900

ALLOY AND PROCESS FOR MANUFACTURING ROLLED STRIP FROM AN ALUMINUM ALLOY ESPECIALLY FOR USE IN THE MANUFACTURE OF TWO-PIECE CANS

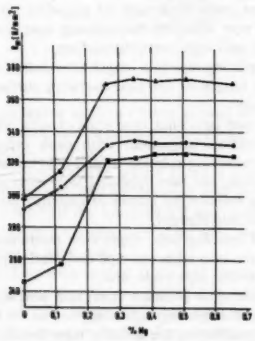
Heinz J. Althoff, Oberursel, Fed. Rep. of Germany, assignor to Vereinigte Deutsche Metallwerke AG, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 341,944, Jan. 22, 1982, Pat. No. 4,431,463. This application Oct. 3, 1983, Ser. No. 538,735

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1981, 3104079; Mar. 17, 1981, 3110277

Int. Cl.³ C22C *21/02*

U.S. Cl. 148—440 **32 Claims**



1. A wrought aluminum alloy, characterized in that it consists of 1.15 to 2.0% manganese, more than 1.0 and up to 2.0% silicon, 0.25 to 0.65% magnesium, 0.2 to 1.0% iron, not in excess of 0.3% copper, not in excess of 0.2% zinc, not in excess of 0.1% zirconium, not in excess of 0.1% titanium, balance aluminum and other impurities not in excess of a total of 0.2%.

4,502,901

MANUFACTURE OF GYPSUM BOARD FROM FGD GYPSUM

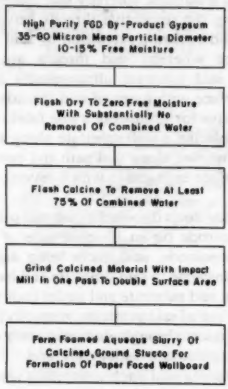
Edward A. Burkard, East Amherst, N.Y., assignor to National Gypsum Company, Dallas, Tex.

Filed Oct. 19, 1983, Ser. No. 543,174

Int. Cl.³ B32B *31/06*

U.S. Cl. 156—39 **18 Claims**

1. The method of making gypsum wallboard comprising the steps of removing substantially all of the free moisture from an about 94% to 98% pure gypsum filter cake of about 35 to 80 micron average particle diameter FGD dihydrate gypsum while avoiding any substantial reduction of particle size of said gypsum other than the breaking up of agglomerates of particles, flash calcining said dried FGD gypsum to about 25% of the water of hydration producing FGD hemihydrate gypsum, grinding at least about 25% of said calcined gypsum to produce a Fisher surface area of material of at least about 2500 cm^2/gm, said surface area being measured on the product as ground if 100% of the calcined gypsum is ground and on a


High Purity FGD By-Product Gypsum
35-80 Micron Mean Particle Diameter
10-15% Free Moisture
Flash Dry To Zero Free Moisture With Substantially No Removal Of Combined Water
Flash Calcine To Remove At Least 75% Of Combined Water
Grind Calcined Material With Impact Mill In One Pass To Double Surface Area
Form Foamed Aqueous Slurry Of Calcined, Ground Stucco For Formation Of Paper Faced Wallboard

blend of the ground product with the unground portion if less than 100% of the calcined gypsum is ground, mixing said post-ground calcined gypsum with water and a lightweight aggregate, and forming the resultant aqueous slurry into board form between opposed paper face sheets.

4,502,902

PROCESS AND APPARATUS FOR ULTRASONICALLY WELDING THREADS TO A MATERIAL

Erwin Zürcher, Le Lignon, Switzerland, and Rémi Cottenceau, Viry, France, assignors to Sirs - Societe Internationale de Revetements de Sol S.A., Neuilly-Sur-Seine, France

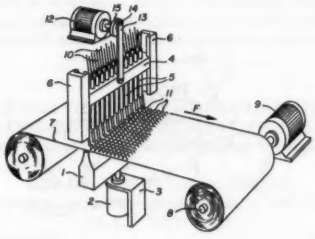
PCT No. PCT/CH82/00125, § 371 Date Aug. 3, 1983, § 102(e) Date Aug. 3, 1983, PCT Pub. No. WO83/01966, PCT Pub. Date Jun. 9, 1983

PCT Filed Dec. 1, 1982, Ser. No. 525,050

Claims priority, application Switzerland, Dec. 3, 1981, 7728/81

Int. Cl.³ B29C *27/08*; D04H *11/04*

U.S. Cl. 156—73.2 **19 Claims**



1. A process for producing a pile fabric which comprises the steps of:

juxtaposing a sonotrode with a reverse surface of a web substrate;

advancing said substrate past said sonotrode;

feeding respective threads to an array of guide ducts oriented generally transverse to an obverse surface of said substrate at ends of said ducts remote from said obverse surface whereby said threads emerge from said ducts at

outlet ends thereof proximal to said obverse surface in the region of said sonotrode; and

alternately displacing said ducts toward and away from said substrate as said substrate is advanced past said sonotrode and in a direction transverse to a vibration emitting surface of said sonotrode whereby said outlet ends intermittently clamp the respective threads between said outlet ends and said substrate supported by said vibration emitting surface whereby said threads are intermittently welded to said substrate ultrasonically and cover said obverse surface with loops of said threads.

11. An apparatus for producing a pile fabric comprising:

means for displacing a web substrate along a path;

a sonotrode disposed along said path and having a vibration emitting surface engageable with a reverse surface of said substrate;

an array of guide ducts disposed along said path in the region of said sonotrode on an opposite side of said substrate from said sonotrode, said ducts being displaceable in a direction transverse to said substrate and having inlet ends remote from said substrate and outlet ends proximal to an obverse surface of said substrate, respective threads being fed to said ducts through said inlet ends and emerging from said ducts at said outlet ends; and

means for displacing said ducts alternately toward and away from said substrate for bringing bearing surfaces at said outlet ends of said ducts into clamping engagement with the respective thread and against said substrate and said vibration emitting surface whereby said threads are ultrasonically welded to said obverse surface and form loops between welds covering said surface.

4,502,903

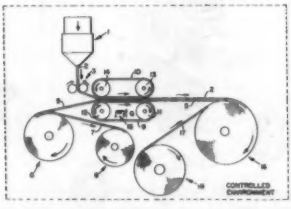
METHOD OF MAKING LITHIUM BATTERIES WITH LAMINAR ANODES

Alan H. Bruder, Burlington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 341,197, Jan. 20, 1982,. This application Jun. 4, 1984, Ser. No. 616,897

Int. Cl.³ B32B *31/22*

U.S. Cl. 156—153 **4 Claims**



1. The method of making a laminate of lithium and conductive plastic, comprising the steps of manipulating a body of lithium metal to expose a fresh surface of unreacted lithium metal, and contacting said freshly exposed surface directly with a sheet of conductive plastic to effect adhesion between said lithium and said conductive plastic without an intermediate adhesive promoting adjunct, said contacting step being carried out under pressure and heat at a temperature below the melting point of lithium.

4,502,904

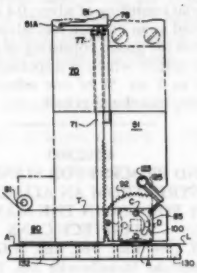
METHOD AND APPARATUS FOR APPLYING SPLICING TAPE WITH POSITIVE AIR PRESSURE ASSIST

Richard L. Clark, Burlington, N.C., assignor to American Multimedia, Inc., Burlington, N.C.

Filed Sep. 27, 1982, Ser. No. 424,284

Int. Cl.³ B31F *5/06;* **B65H** *69/06*

U.S. Cl. 156—157 **11 Claims**



4. A method for applying splicing tape to two tape ends, comprising the steps of:

(a) releasably dispensing splicing tape onto a splicing tape applicator having at least one planar tape carrying surface with an underlying port therein and retaining said splicing tape on said tape carrying surface until applied to the two opposing tape ends by means of negative air pressure through said port whereby the splicing tape is releasably urged against said tape carrying surface;

(b) cutting the splicing tape to a length substantially coextensive with the length of the tape carrying surface of said tape applicator;

(c) positioning two opposing tape ends closely adjacent to and in longitudinal alignment with each other and in splicing tape receiving relation to said splicing tape applicator and holding the two opposing tape ends in splicing tape receiving relation by means of negative air pressure applied to one side thereof;

(d) moving said splicing tape applicator momentarily into contact with the two adjacent tape ends and applying the splicing tape to the tape ends; and,

(e) directing positive air pressure from said port against the splicing tape as the splicing tape is applied to the tape ends to aid in firmly adhering the splicing tape thereto without gaps or bubbles in the splice.

6. In an apparatus for winding magnetic recording tape into a cassette, comprising a drive spindle for receiving and rotating one of the cassette spools for winding a pre-determined length of magnetic recording tape from a supply reel into the cassette; means for cutting the cassette leader tape and magnetic recording tape and placing their respective free ends in position to receive a length of splicing tape; and means for ejecting a cassette wound with recording tape from the drive spindle and replacing the cassette with an empty one, the combination therewith of a splicing for applying adhesive splicing tape to the two tape ends, and comprising:

(a) a source of splicing tape;

(b) a splicing tape applicator having at least one planar tape carrying surface;

(c) means for reciprocating said splicing tape applicator into and out of momentary contact with two tape ends positioned in splicing tape receiving relation to said splicing tape applicator;

(d) port means communicating with said tape carrying surface of said splicing tape applicator;

(e) a source of positive and negative air pressure for selective communication with said port means;

(f) air pressure control means for applying negative air pres-

sure through said port means to hold the splicing tape on the tape carrying surface, positive air pressure through said port means to said splicing tape to aid in removing the splicing tape from the tape carrying surface and firmly adhering the splicing tape to the tape ends without gaps or bubbles in the splice; and,

(g) means for exerting negative air pressure on the free ends of the recording tape and leader tape to hold them in position until the splicing tape is applied thereto.

4,502,905

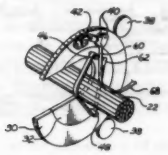
TYING MACHINE AND METHOD

Charles H. Jung, and Charles G. Jung, both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 30, 1982, Ser. No. 431,059

Int. Cl.³ B65H *81/00;* **B31F** *1/00;* **B29C** *19/04;* **B21F** *45/00*

U.S. Cl. 156—184 **52 Claims**



1. An apparatus to tie a ribbon around an object, such as a bundle of wires, said apparatus comprising:

(a) a housing having:

(1) a wrapping area where there is a longitudinal axis, a vertical axis, and a transverse axis perpendicular to and intersecting the longitudinal and vertical axes;

(2) a reference plane coinciding with said longitudinal and vertical axes; and

(3) a tying area spaced from said transverse axis;

said wrapping area having first and second sides on opposite sides of said reference plane, and an outside direction denoting location further from said transverse axis and an inside direction denoting location closer to said transverse axis;

(b) a carrier mounted to the housing and adapted to engage a lead portion of said ribbon and move in a wrapping path circumscribing said wrapping area;

(c) transversely movable locating pin and tie finger means to locate said ribbon around said wrapping area and to move said ribbon transversely;

(d) control means to move said carrier in a circumferentially forward direction along said wrapping path to the tying area so that a wrapping portion of the ribbon extends around the wrapping area and a trailing portion of the ribbon is positioned at the tying area on the second side of the lead portion, and to operate the locating and tie means to move the lead portion and trailing portion transversely relative to one another in one direction to move said lead portion to the second side of the trailing portion, with one of the portions being outside the other of the portions, then moving the lead portion and trailing portion transversely relative to one another in an opposite direction to move said lead portion to the first side of the trailing portion, with the other of said portions being inside said one of said portions to form a tie at the tie area.

4,502,906

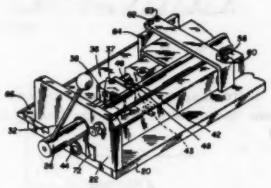
HEAT WELDING OF THERMOPLASTICS

William E. Young, 60 W. Concourse, Neptune, N.J. 07753; Ernst W. Gerber, Sabattos Rd., Center Lovell, Me. 04016, and William R. Pasco, Bricktown, N.J., assignors to William E. Young and Ernst W. Gerber

Continuation-in-part of Ser. No. 327,127, Dec. 2, 1981, abandoned. This application Apr. 29, 1983, Ser. No. 489,932

Int. Cl.³ B32B *31/18*

U.S. Cl. 156—251 **15 Claims**



1. A method of joining the congruent edges of a plurality of laminar thermoplastic plies of material and including providing heating for melting locally said plies at a programmed temperature and for a selected time period, said method including the steps of:

(a) bringing said congruent plies to and between opposed cooled metal jaws, each of which have sharp corners at their facing and gripping edges, and with at least one of the jaws movable so as to provide a clamping condition of the plies of material and with the jaws applying a predetermined pressure which avoids unwanted divergence of the plies;

(b) precisely positioning the congruent edges of the plies so that the edges of said thermoplastic material extend from the sharp corners of the facing and gripping edges of the opposed cooled jaws, this extending positioning of said edges of the plies at a distance of one-sixteenth of an inch and within production limits of plus or minus one sixty-fourth of an inch;

(c) heating said extending edges of the plies to a determined degree of temperature which is greater than the melting temperature of the plastic to be welded, said heating by a ribbon of conductive metal which is brought to desired heat by passing electrical current therethrough sufficient to melt the plies of plastic and cooling said ribbon when the current is caused to be shut off, this heating creating a melting and weld of said edges of the plies, and

(d) cooling the melted portion of the plies of thermoplastic material so as to again solidify said material while maintaining a gripping of said plies by the cooled metal jaws until solidification of the molten weld is achieved.

4,502,907

DEVICE FOR THE MANUFACTURE OF NATURAL LOOKING MODEL RAILWAY TRACKS

Janos Josza, Hisings Backa, Sweden, assignor to Jomo Jigs AB, Odsmal, Sweden

Filed Dec. 6, 1983, Ser. No. 558,520

Claims priority, application Sweden, Dec. 8, 1982, 8206988

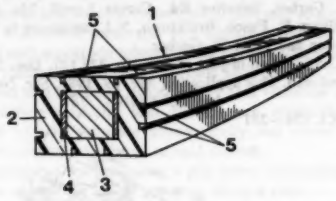
Int. Cl.³ B27H *6/00*

U.S. Cl. 156—349 **16 Claims**

1. A device for the manufacture of natural looking model railway tracks and of the type incorporating a plurality of retainer members with means for retaining two track rails in mutually spaced apart positions, and at least one flexible, elongated interconnecting member adapted to interconnect said retainer members, characterized therein,

that said interconnecting member/s is/are designed with mainly the same flexural resistance in all directions, and adapted to be bendable to optional angular positions relative to the retainer members in order to allow bending of

the interconnecting member, and thereby also the rails in more than one plane, and that said interconnecting mem-



ber/s is/are adapted to maintain or can be brought to maintain its curvature after the flexing force being relieved.

4,502,908

APPARATUS FOR INTERMITTENTLY ACTUATING HEATING TOOLS IN PACKING MACHINES

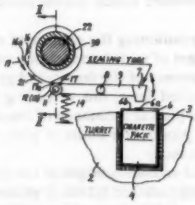
Nils von Wichert, Glinde, and Dieter Schwenke, Hamburg, both of Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Oct. 12, 1983, Ser. No. 541,293

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1982, 3238234

Int. Cl.³ B21J *9/10*

U.S. Cl. 156—350 **20 Claims**



1. Apparatus for intermittently actuating a heated sealing tool in a machine, such as a cigarette packing machine, wherein the tool is moved into and from heat-transmitting engagement with components of heat-sealable wrapping material, comprising a pair of rotary cams arranged to jointly actuate the tool during a portion of each revolution thereof; drive means for rotating said cams at a variable speed; and regulating means for maintaining the intervals of actuation of the tool at a constant value during each revolution of said cams regardless of changes in rotational speed of said cams, including means for changing the orientation of at least one of said cams with reference to the other of said cams as a function of variations of rotational speed of said cams and while said drive means rotates said cams.

4,502,909

METHOD AND APPARATUS FOR ADHERING A WORKPIECE TO A SUPPORT BLOCK

Charles L. Tomesko, St. Petersburg, Fla., assignor to Automated Optics, Inc., Clearwater, Fla.

Filed Oct. 18, 1979, Ser. No. 86,130

Int. Cl.³ B31F *5/00*; B65C *11/04*

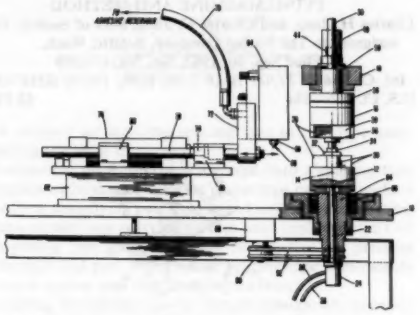
U.S. Cl. 156—356 **2 Claims**

1. Apparatus for aligning and mounting a lens precursor on a support block for subsequent use in a machine for fabricating optical lenses, comprising:

first means for supporting one of a lens precursor and a support block in a predetermined fixed position relative to an alignment axis;

second means for supporting the other of a lens precursor and a support block in a predetermined radially fixed position relative to the alignment axis and translatable relative to said first supporting means along the alignment axis between a first position in which a lens precursor and a support block supported in said first and second supporting means are spaced from one another and a second position in which the lens precursor and support block engage one another;

means for depositing a predetermined quantity of adhesive on the lens precursor or support block supported in said first supporting means while said second supporting means is in said first portion, said depositing means being movable between a first position proximate said first supporting means to deposit adhesive on a lens precursor or support block supported in said first supporting means and



a second position in which it is spaced from said first and second supporting means;

means for automatically moving said depositing means from said second position to said first position in response to a signal from an operator indicating that a lens precursor and a support block are supported in said first and second supporting means and for returning said depositing means to said second position after a predetermined amount of adhesive has been deposited; and

means for automatically translating said second supporting means from said first position to said second position in response to movement of said deposition means from said first position to said second position, wherein said moving means comprises a fluid actuated cylinder, and wherein said second supporting means comprises a vertically translatable support member operatively connected to said cylinder, a chuck mounted on said support member, and means for providing limited vertical movement between said chuck and said support member.

4,502,910

LITERATURE APPLYING MECHANISM

Helmut Voltmer, Park Ridge; Alfred F. Schwenzer, Totowa, and Edward J. Mazur, Montville, all of N.J., assignors to NJM, Inc., Fairfield, N.J.

Filed Oct. 17, 1983, Ser. No. 542,731

Int. Cl.³ B65C *9/40*

U.S. Cl. 156—361 **9 Claims**

1. A system for applying single and multi-folded sheets of literature to an object having a side wall for receiving the literature comprising:

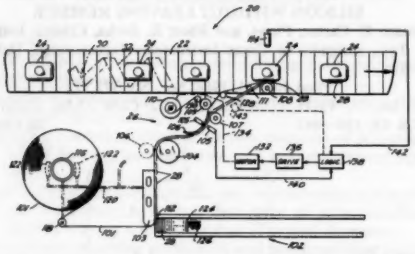
a hopper having an exit gate positioned for dispensing a piece of the literature;

means for pressing a piece of the literature against the side wall of the object;

means for guiding the object past said pressing means;

a tape having an adhesive coating on a front side thereof for carrying pieces of the literature to said pressing means;

means for guiding said tape past an opening in said hopper through which the literature is dispensed, said guiding means including a pick-up bar disposed at said opening and being in contact with a back side of said tape, said bar guiding said tape past a terminal piece of literature in said hopper and past said gate, said hopper including means for urging literaure toward said bar resulting in a pressing of the terminal piece of literature against the adhesive coating on said tape, said terminal piece of literature adhering to said tape to move therewith;



means responsive to the position of said object at said pressing means for moving said tape to deliver a piece of the literature to said pressing means, a movement of said tape past said hopper opening withdrawing a piece of literature adhering to said tape, withdrawn literature being metered by said gate;

means responsive to the movement of said tape for transferring a piece of the literature from the tape to the pressing means, adhesive of the tape being retained upon the piece of literature, thereby to press the literature against the object and secure the piece of literature to the object.

4,502,911

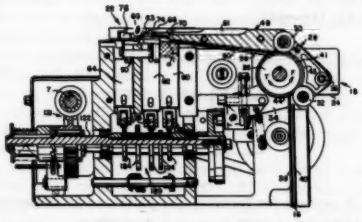
STRAPPING MACHINE

James L. Discavage, Brookhaven, Pa., assignor to Cyklop International Emil Hoffman, KG, Fed. Rep. of Germany

Filed Jul. 27, 1983, Ser. No. 517,641

Int. Cl.³ B30B *15/34;* B65B *13/32*

U.S. Cl. 156—499 **8 Claims**



1. In a strapping apparatus, a seal assembly having an anvil and platen for compressing opposed strap ends against a laterally movable heat seal blade so as to form a seal, and which further includes a pair of vertically movable seal guides positioned on each side of said overlapped strap ends and within the region of said ends which are to become the seal thereby preventing lateral movement of said strap when said blade is withdrawn.

4,502,912

APPARATUS FOR MAKING GLUE STRIPS ON A RAPIDLY MOVING WEB

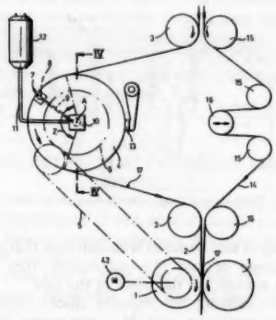
Erich Steiner, Brannenburg, and Theo Hesselmann, Post Vogtareuth, both of Fed. Rep. of Germany, assignors to Planatolwerk Willy Hesselmann, Chemische Und Maschinenfabrik Für Klebetechnik GmbH & Co. KG, Rohrdorf-Thansau, Fed. Rep. of Germany

Filed Jun. 10, 1983, Ser. No. 503,315

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1982, 3222335

Int. Cl.³ B32B *31/08;* B05C *5/02*

U.S. Cl. 156—548 **20 Claims**



1. An apparatus for forming a succession of equispaced and transversely extending glue strips on a longitudinally extending web, the apparatus comprising:

an applicator drum rotatable about a drum axis and having a cylindrical outer surface with a circumference equal to a whole-number multiple of the desired distance between succeeding strips, the drum being formed with at least one axially extending manifold passage and an axially extending row of bores opening radially outward at the drum surface and inward into the passage;

guide and transport means for displacing the web longitudinally at very high speed past the applicator drum with the web looped over same and engaging same over an angularly extending contact region of at least 90° relative to the axis;

drive means for rotating the drum about the axis synchronously with the web at a peripheral speed substantially equal to the very high displacement speed of the web;

a stationary supply of liquid glue suitable for forming the strips; and

conduit means connected between the supply and the manifold passage for conducting the glue from the supply to the bores and thence to the surface of the drum along the row of bores, whereby the glue emerging from the bores is applied as the strip to the passing web.

4,502,913

TOTAL DIELECTRIC ISOLATION FOR INTEGRATED CIRCUITS

John S. Lechaton, Wappingers Falls; Shashi D. Malaviya, Fishkill; Dominic J. Schepis, Wappingers Falls, and Gurumakonda R. Srinivasan, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1982, Ser. No. 393,932

Int. Cl.³ H01L *21/306, 27/04;* B44C *1/22;* C03C *15/00*

U.S. Cl. 156—643 **22 Claims**

1. Method for fabricating a total dielectrically isolated integrated circuit in a monocrystalline silicon body comprising:

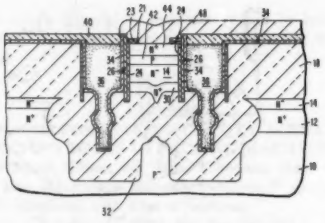
providing in a monocrystalline silicon body having a monocrystalline silicon region on one major surface of said

body dielectrically isolated at said surface from other such regions by two parallel strips of dielectric material;

said silicon body having an N+ sub-region spaced from said major surface of said body and extending parallel to said major surface at least substantially across said entire body and below said dielectric strips;

anisotropically etching parallel pairs of trenches within said monocrystalline region between said strips of dielectric material and through said N+ sub-region;

the etch rate of said anisotropically etching is adjusted to cause a preferential etching of said N+ sub-region so that a portion of the said N+ region is removed and monocrystalline silicon remains above this removed portion;



the spacing of said trenches is chosen such that said preferential etching of said N+ sub-region from each trench closely approaches the other of the pair;

thermally oxidizing the exposed silicon surfaces of said trenches until the said N+ sub-region between said trenches is totally oxidized to silicon dioxide;

filling said trenches with dielectric material to produce said total dielectrically isolated silicon region;

forming semiconductor devices in said total dielectrically isolated silicon region; and

contacting the elements of said devices in said region and connecting them to similar devices in said other such region to form said integrated circuit.

4,502,914

METHOD OF MAKING STRUCTURES WITH DIMENSIONS IN THE SUB-MICROMETER RANGE

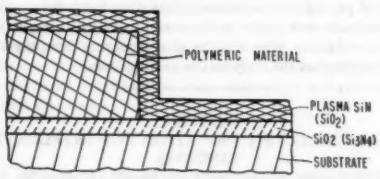
Hans-Joachim Trumpp, Stuttgart, and Johann Greschner, Pliezhausen, both of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1983, Ser. No. 546,612

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1982, 3242113; European Pat. Off., Oct. 5, 1983, 83109945.2

Int. Cl.³ H01L *21/306*; B44C *1/22*; C03C *15/00*; B29C *17/08*

U.S. Cl. 156—643 **22 Claims**



1. Method for fabricating sub-micrometer dimensioned structures using a polymeric layer comprising:

providing a body to form said structures;

depositing said polymeric layer upon said body;

removing portions of said polymeric layer where the edges of the formed openings are at locations where said sub-micrometer dimensioned structures are desired;

forming a sub-micrometer dimensioned sidewall structure on the said edges of the polymeric layer of substantially the same width as the desired said sub-micrometer dimensioned structures and at a temperature which is less than a temperature which would adversely affect said polymeric layer;

removing the remaining said polymeric layer; and

using the said sidewall structure as the mask to form the sub-micrometer structures in said body.

4,502,915

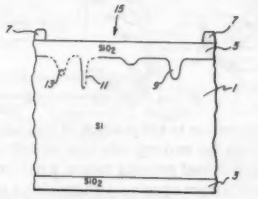
TWO-STEP PLASMA PROCESS FOR SELECTIVE ANISOTROPIC ETCHING OF POLYCRYSTALLINE SILICON WITHOUT LEAVING RESIDUE

Dusne E. Carter, Plano, and Rhett B. Jucha, Celeste, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 23, 1984, Ser. No. 572,772

Int. Cl.³ H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **20 Claims**



1. A method of etching polycrystalline silicon disposed over an insulating base and having contaminants extending to the surface of the silicon face opposite said base, comprising the steps of:

(a) etching said face with a substantially non-selective etchant, and

(b) etching said face with an etchant selective to polycrystalline silicon.

4,502,916

PROCESS FOR FORMING FINE PATTERNS

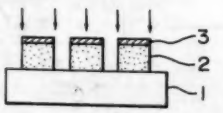
Hiroshi Umezaki, Koganei; Naoki Koyama; Yoozi Maruyama, both of Hachioji, and Yutaka Sugita, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 3, 1984, Ser. No. 607,000

Claims priority, application Japan, May 4, 1983, 58-77436

Int. Cl.³ B44C *1/22*; C03C *15/00, 25/06*; B29C *17/08*

U.S. Cl. 156—643 **7 Claims**



1. A process for forming fine patterns which comprises

(a) forming a resin layer on a workpiece;

(b) forming on said resin layer a layer of a titanium or tantalum compound;

(c) forming on said titanium or tantalum compound layer a resist pattern having a desired configuration; and

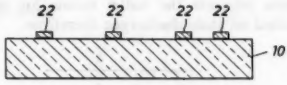
(d) etching said titanium or tantalum compound layer using said resist pattern as a mask, and

(e) etching said resin layer using the resulting titanium or tantalum compound layer as a mask.

4,502,917
PROCESS FOR FORMING PATTERNED FILMS

Rhodes R. Chamberlin, El Paso, Tex., assignor to Cherry Electrical Products Corporation, Waukegan, Ill.

Division of Ser. No. 186,855, Sep. 15, 1980, Pat. No. 4,344,817.
This application Mar. 29, 1982, Ser. No. 363,116
Int. Cl.³ C03C 17/34, 17/25
U.S. Cl. 156—645 23 Claims



1. A method of manufacture for forming patterned films, comprising the steps of:

heating a transparent vitreous substrate surface to a first selected temperature,

spraying a solution containing a concentration of polycrystalline forming materials onto said heated substrate surface,

said substrate temperature and said concentration of materials cooperating to form a first layer of polycrystalline material having a selected range of crystal diameters,

selectively removing portions of said polycrystalline material from said substrate to define a first pattern of exposed substrate,

forming a first film of a pattern material to a selected thickness over said exposed substrate and remaining portions of said layer of polycrystalline material,

said selected thickness cooperating with said selected range of crystal diameters to form a discontinuous surface of said film of pattern material over said remaining portions of said layer of polycrystalline material, and

penetrating said discontinuous surface with a chemical etchant to remove said remaining portions of said layer of polycrystalline material and overlying portions of said pattern material therewith, so that remaining portions of said pattern material form a first patterned film on said substrate surface.

4,502,918
TWO-STAGE CHEMICAL TREATMENT OF MECHANICAL WOOD PULP WITH SODIUM SULFITE

David M. Mackie, and Peter Joyce, both of Vancouver, Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada

Continuation-in-part of Ser. No. 272,400, Jun. 10, 1981, abandoned. This application Jun. 4, 1982, Ser. No. 385,286
Int. Cl.³ D21C 3/04, 3/26
U.S. Cl. 162—24 26 Claims

1. A method of improving the properties of mechanical refiner wood pulp, comprising the steps of:

applying an aqueous solution of sodium sulfite, in the range of about 1%–10% sodium sulfite based on bone dry weight of wood, to wood particles, selected from the group consisting of wood chips, shredded wood chips, and shavings, the solution having a pH in the range of about 4.5–11;

heating the sodium sulfite treated wood particles to a temperature in the range of about 100°–160° C. and maintaining the particles in the temperature range for a period of time in the range of about 20 seconds to 10 minutes;

refining the heated sodium sulfite treated wood particles into mechanical wood pulp;

separating the pulp into a long fiber fraction and an accept fraction, the long fiber fraction containing a higher proportion of shives and long fiber material, said long fiber fraction representing about 10%–65% by weight of the whole refiner pulp;

applying an aqueous solution of sodium sulfite in the range of about 4%–50% sodium sulfite based on bone dry weight of wood, to the long fiber fraction, the solution having a pH in the range of about 4.5–11;

cooking the sodium sulfite treated long fiber fraction at a temperature in the range of about 100°–160° C. for a period of time in the range of about 2–120 minutes;

refining the cooked sodium sulfite treated long fiber fraction to provide a refined long fiber fraction that provides handsheets prepared according to TAPPI standard T205 om-81 and, when tested according to TAPPI standard T220 os-71, having a freeness in the range of about 100–300 ml, sheet density in the range of about 0.4–0.55 g/cm³, burst index in the range of about 3.2–4.6 g/cm³, breaking length in the range of about 6500–7800 m and tear index in the range of about 8–14 mN.m²/g;

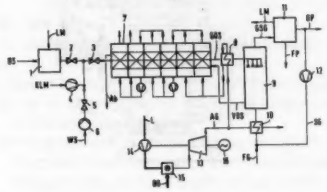
recombining at least part of the refined long fiber fraction with at least part of the accept fraction; and

the combined weight of the accept fraction and the refined long fiber fraction, being at least about 90% based on bone dry weight of wood particles.

4,502,919
PLANT FOR EXTRACTING CRUDE OIL FROM OIL SHALE

Gerd Brunner, Roth; Rainer Hoffmann, Nuremberg, and Konrad Künstle, Röttenbach, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim an der Ruhr, Fed. Rep. of Germany

Filed Oct. 7, 1983, Ser. No. 540,192
Claims priority, application Fed. Rep. of Germany, Oct. 11, 1982, 3237647
Int. Cl.³ B01D 11/02; C10B 53/06; C10G 1/06
U.S. Cl. 196—14.52 7 Claims



1. A plant for extracting crude oil from oil shale comprising a low temperature carbonization reactor for effecting hydrogenating low temperature carbonization of oil shale under pressure; a processing means, upstream of the low temperature carbonization reactor, for processing the oil shale, in particulate form, by mixing it with a liquid solvent and with hydrogen to form a slurry in which the oil shale is dispersed in the solvent containing dissolved hydrogen, and for feeding the slurry into the low temperature carbonization reactor; a separating means, downstream of the low temperature carbonization reactor, for separating the reaction products from the reactor into a fluid low temperature carbonization mixture containing solvent and spent oil shale and for separating the fluid low temperature carbonization mixture into gaseous and liquid low temperature carbonization products and solvent; a return means for recycling said solvent separated from the reaction products from the reactor to said processing means; a gas turbine for the supply of energy to the plant, with the exhaust gas outlet of the gas turbine connected to two heat exchangers, a circulation system for a scavenging gas, which circulation system includes a separating reactor which forms part of said separating means in which in use the scavenging gas flows upwardly in counterflow to the oil shale for separation of the fluid low temperature carbonization mixture from the spent oil shale, one of said two heat exchangers being disposed in the circulation system to effect heating of the scavenging gas prior to its entrance into the separating reactor, the other of said two heat exchangers disposed between the low temperature car-

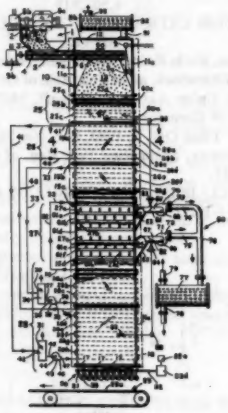
bonization reactor and the separating reactor to effect heating of the reaction products from the low temperature reactor prior to entrance into the separating reactor; said low temperature reactor including a fluidizing cooler with a fluidized bed, transfer means for feeding spent oil shale from the separating reactor to the fluidized bed of the fludizing cooler, and feeding the turbine exhaust gas from at least one of said two heat exchangers to the fluidized bed of the fluidizing cooler for fluidizing the bed.

4,502,920

APPARATUS FOR ABOVEGROUND SEPARATION, VAPORIZATION AND RECOVERY OF OIL FROM OIL SHALE

Ray C. Edwards, Kinnelon, N.J., assignor to Edwards Engineering Corporation, Pompton Plains, N.J.

Filed Jan. 14, 1983, Ser. No. 457,975
Int. Cl.³ C10B *1/04, 49/00*
U.S. Cl. 202—120 **28 Claims**



1. A retort apparatus for recovering hydrocarbons from oil shale comprising:

a. an elongated housing, having a passage means end to end therethrough, inlet means to permit delivery of crushed oil shale into one end of the housing for movement along said passage means, and an outlet means in communication with the end of the passage means remote from the inlet means for removing the spent crushed oil shale from the passage means,

b. a plurality of heat exchange means connected in said housing for heat exchange with the crushed oil shale moving through said passage means disposed serially between the inlet means and the outlet means to define in the passage means a dying zone, a preheat zone, a hydrocarbon recovery zone, and a waste heat recovery zone,

c. circulating means connecting the respective one of said plurality of heat exchange means in the preheat zone with the respective one of said plurality of heat exchange means in the waste heat recovery zone for passing waste heat from said waste heat recovery zone to said preheat zone,

d. auxiliary heating means connected to the one of said plurality of heat exchange means in said hydrocarbon recovery zone to raise the temperature of the crushed oil shale moving therethrough to the critical temperature for separating hydrocarbon vapors from said crushed oil shale,

e. separating means connected in said housing for communication with said hydrocarbon recovery zone to withdraw and condense the hydrocarbon vapors released from the crushed oil shale moving through the passage means and to recover the same,

f. means connected to the housing to control movement of crushed oil shale through said passage means,

g. means for sensing the pressures in said passage means on opposite sides of said hydrocarbon recovery zone,

h. means for adjusting the pressure in said hydrocarbon recovery zone in response to the sensed pressures and to a pressure greater than the pressures in the other zones, and

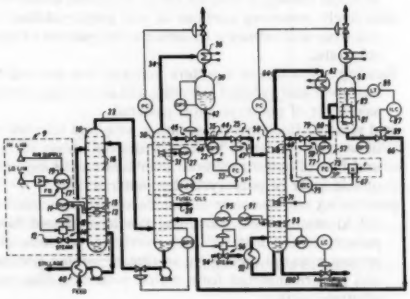
i. means adjacent the outlet means for removing spent crushed oil shale discharged therefrom.

4,502,921

APPARATUS FOR THE CONTROL OF ALCOHOL DISTILLATION

Francis G. Shinskey, Foxboro, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Division of Ser. No. 260,954, May 6, 1981, Pat. No. 4,358,346. This application Aug. 17, 1982, Ser. No. 408,966
Int. Cl.³ B01D *3/42*
U.S. Cl. 202—154 **10 Claims**



1. In an azeotropic distillation process plant for producing an anhydrous alcohol which includes a beer still means (10) adapted for stripping solid mash of its alcohol, a rectifying column means (30) adapted for producing azeotropic alcohol in the range of about 190 proof, means for removing the alcohol from the beer still means and feeding said alcohol to the rectifying column a reboiler means (52) associated with a dehydrating column means (50) from which anhydrous ethanol is separated as a bottom product, wherein the rectifying column is adapted for the production of a first azeotrope of water and alcohol as a feedstock to the dehydrating column, and further includes means (58, 59, 60) for the introduction of a hydrocarbon solvent into said dehydrating column as an entrainer for forming a second azeotrope for effecting separation of said first azeotrope, a control subsystem adapted for efficient control of the operation of said process plant in production of the desired anhydrous product, said subsystem comprising:

a. sensing means (69, 71, 75) for detecting a change in the concentration of said hydrocarbon solvent within said dehydrating column means;

b. first control loop means (57) for regulating, in response to said sensing means, the amount of said hydrocarbon solvent within said dehydrating column to maintain the precise amount of said hydrocarbon solvent required to effectuate separation; and

c. second control loop means (56, 91, 93, 95) for regulating the amount of heat supplied to said dehydrating column reboiler (52) to separate said first azeotrope into its constituents and to remove said hydrocarbon solvent from said alcohol.

4,502,922

COKE OVEN CHAMBER DOOR

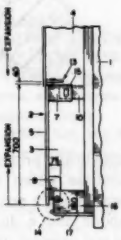
Wilhelm Stewen, Gibbenhey 8, 4600 Dortmund 50, and Peter Pape, Ringstr. 26, 4200 Oberhausen, both of Fed. Rep. of Germany

PCT No. PCT/DE83/00004, § 371 Date Sep. 15, 1983, § 102(e) Date Sep. 15, 1983, PCT Pub. No. WO83/02454, PCT Pub. Date Jul. 21, 1983

PCT Filed Jan. 15, 1983, Ser. No. 537,404

Int. Cl.³ C10B *25/06, 29/04*

U.S. Cl. 202—248 5 Claims



1. A coke oven chamber door comprising a fireproof plug and a door-body plate, said fireproof plug including a plurality of steel plates with an upper and a lower steel plate having end portions overlapping one another in the longitudinal direction of the plug, said upper steel plate being supported for displacement only in a downward direction in response to thermal expansion thereof, and means supported by said door-body plate for carrying the lower end of said lower steel plate in a stationary manner such that the end thereof lying thereabove is only displaceable upwardly in response to thermal expansion to maintain a constant height of said steel plates on said door-body plate.

4,502,923

PRODUCTION OF HIGH PURITY ALKYL GLYOXYLATE BY PLURAL STAGE DISTILLATION

David R. Dyroff, Creve Coeur; Yueting Chou, Chesterfield, and Dario R. Cova, Kirkwood, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 6, 1983, Ser. No. 539,506

Int. Cl.³ B01D *3/10;* C07C *69/66*

U.S. Cl. 203—71 20 Claims

1. A process for production of high purity alkyl glyoxylate from a mixture containing alkyl glyoxylate, alkyl glycolate, water, alcohol and miscellaneous impurities, said mixture having an alkyl glycolate/alkyl glyoxylate molar ratio greater than about 1.0, which comprises:

(a) reducing the water and alcohol content by distilling the mixture at a reduced pressure to provide a residue mixture having a combined water and alcohol content of less than about 1% by weight; where the residue mixture has an alkyl glycolate/alkyl glyoxylate molar ratio greater than about 1.5;

(b) reducing the alkyl glycolate content by distilling the residue mixture at a lower pressure to provide a residue mixture having an alkyl glycolate/alkyl glyoxylate molar ratio in the range of about 1.0 to about 1.4;

(c) distilling the residue mixture at increased pressure and recovering high purity alkyl glyoxylate as the distillate.

4,502,924

METHOD FOR REPAIRING A MOLD FOR CONTINUOUS CASTING OF STEEL

Kenji Minami; Yoshimasa Kawata; Tetsuji Ushio; Hoshiro Tani, and Kazuhisa Mitani, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo and Mishima Kosan Company, Limited, Kitakyushu, both of, Japan

Filed Aug. 27, 1982, Ser. No. 412,973

Claims priority, application Japan, Sep. 1, 1981, 56-138081

Int. Cl.³ C25D *5/40*

U.S. Cl. 204—16 1 Claim

1. A method for repairing a mold used for continuous casting of steel with respect to its nickel or nickel-base alloy plated layer wherein the nickel or nickel-base alloy plated layer have been provided on at least a part of the surface of the mold which is made of copper or copper alloy, which comprises abrading the surface without completely removing said nickel or nickel-base alloy plated layer, subjecting the abraded exposed surface to a dipping treatment with concentrated strong acid to activate the same, and thereafter providing a nickel or nickel-base alloy layer thereon, said concentrated strong acid being of at least 40 wt. % concentration, and being either nitric acid only of at least 60 wt.% concentration or a mixture of at least 50 vol.% of said nitric acid and at least one member selected from sulfuric acid, hydrochloric acid and hydrofluoric acid.

4,502,925

PROCESS FOR ALUMINUM SURFACE PREPARATION

John E. Walls, Hampton, N.J., assignor to American Hoechst Corporation, Somerville, N.J.

Filed Jun. 11, 1984, Ser. No. 619,105

Int. Cl.³ C25F *3/04;* C25D *11/16, 11/18*

U.S. Cl. 204—33 21 Claims

1. A method for treating an aluminum sheet which comprises:

(a) immersing said sheet in an aqueous bath containing

(i) up to about 25% by weight of hydrochloric and/or nitric acids, and

(ii) from about 1 to about 25% by weight of an inorganic fluorine containing acid or a salt thereof; said immersion being conducted for a length of time sufficient to impart an etch to the surface of said aluminum sheet; and

(b) electrochemically graining said sheet in an aqueous electrolyte comprising one or more acids selected from the group consisting of nitric acid and hydrochloric acid; and

(c) anodizing said sheet in an aqueous electrolyte comprising one or more acids selected from the group consisting of sulfuric acid and phosphoric acid.

4,502,926

METHOD FOR ELECTROPLATING METALS USING MICROEMULSION ADDITIVE COMPOSITIONS

Loren L. Barber, Jr., Lake Elmo, Minn., assignor to MacDermid, Incorporated, Waterbury, Conn.

Filed Aug. 22, 1983, Ser. No. 525,578

Int. Cl.³ C25D *3/02, 3/22*

U.S. Cl. 204—45.1 8 Claims

1. A method of metal electroplating comprising the steps of preparing a microemulsion concentrate comprising a stable microemulsion comprised of water, a brightening agent and a surfactant component, the concentration of said brightening agent in said microemulsion being at least about 1% by weight based on the total weight of components of the microemulsion, and adding the microemulsion concentrate to an electroplating bath in a small but effective amount to maintain said bath below its cloud point, said brightening agent being one which is substantially water-insoluble both at the temperatures and concentrations of said electroplating bath and at the conditions under which said microemulsion is formed.

4,502,927
ELECTRODEPOSITION OF CHROMIUM AND ITS ALLOYS

Donald J. Barclay, Winchester; William M. Morgan, Chandlers Ford, and James M. Vigar, Winchester, all of England, assignors to International Business Machines Corporation, Armonk, N.Y.

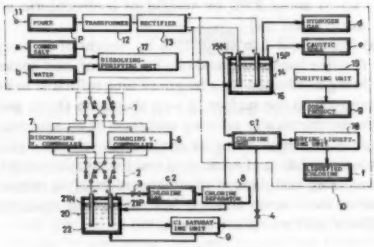
Filed Nov. 1, 1982, Ser. No. 437,989
Claims priority, application United Kingdom, Nov. 18, 1981, 8134776
Int. Cl.³ C25D *3/06*
U.S. Cl. 204—51 20 Claims

1. A chromium electroplating electrolyte containing trivalent chromium ions, a complexant, a buffer agent and an organic compound having a —C═S group or a —C—S— group within the molecule for promoting chromium deposition, the complexant being selected so that the stability constant K_1 of the reaction between the chromium ions and the complexant is in the range $10^8 < K_1 < 10^{12} M^{-1}$ at about 25° C.

4,502,928
METHOD AND APPARATUS FOR PRODUCING HALOGEN

Tetsumasa Umetani, Takatsuki, and Katsutoshi Matsunaga, Nagareyama, both of Japan, assignors to Hitachi Zosen Corporation, Osaka, Japan

Filed Dec. 8, 1983, Ser. No. 559,602
Claims priority, application Japan, Dec. 8, 1982, 57/215892
Int. Cl.³ C25B *1/34*
U.S. Cl. 204—98 10 Claims

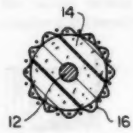


6. An apparatus for producing a halogen comprising a commercial power terminal, a halogen production device for receiving a supply of drive power from the commercial power terminal, a metal-halogen secondary cell containing in its electrolyte the same halogen as the halogen to be produced by the production device, first power supply means for supplying charging power from the commercial power terminal to the metal-halogen secondary cell, second power supply means for supplying the power generated by the metal-halogen secondary cell to the production device, switch means for alternatively selecting between the first power supply means and the second power supply means, means for adding the halogen produced by the metal-halogen secondary cell to the halogen produced by the production device when the first power supply means is selected by the switch means, and means for supplying a portion of the halogen produced by the production device to the electrolyte of the metal-halogen secondary cell when the second power supply means is selected by the switch means.

4,502,929
CORROSION PROTECTION METHOD

Ray F. Stewart; Michael Masia, both of Redwood City, and Albert B. Macknick, Newark, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 272,854, Jun. 12, 1981, abandoned. This application Jul. 29, 1982, Ser. No. 403,203
Int. Cl.³ C23F *13/00*
U.S. Cl. 204—147 15 Claims



1. A method of cathodically protecting an elongate, electrically conductive substrate which is buried in soil, which method comprises establishing a potential difference between the substrate as cathode and a distributed elongate anode which is buried in the soil adjacent to the substrate and spaced apart from the substrate by soil, the anode comprising a flexible strip comprising

(1) a continuous elongate flexible metal core which has a resistance at 23° C. of less than 0.03 ohm/meter; and

(2) an elongate element which

(i) is in electrical contact with the core;

(ii) is composed of a conductive polymer having an elongation of at least 10% and a resistivity at 23° of 0.1 to 10^3 ohm.cm;

(iii) provides substantially the whole of the electrochemically active surface of the flexible strip; and

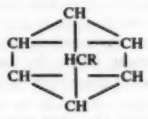
(iv) is at least 500 microns thick.

4,502,930
METHOD FOR MANUFACTURE OF 7-SUBSTITUTED QUADRICYCLENE-CYCLODEXTRIN INCLUSION COMPOUND

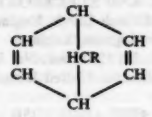
Takaari Yumoto, Nagoya; Kiyoshi Hayakawa, Gifu; Kaoru Kawase, Nagoya; Hiromi Yamakita, Owari-Asahi, and Hiroshi Taoda, Nagoya, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Feb. 29, 1984, Ser. No. 584,739
Claims priority, application Japan, Jun. 27, 1983, 58-116725; Jun. 27, 1983, 58-116729
Int. Cl.³ C08B *37/16*
U.S. Cl. 204—160.1 3 Claims

1. A method for the manufacture of an inclusion compound comprised of 7-quadricyclene represented by the general formula:



wherein R denotes one member selected from the group consisting of hydrogen atom, hydroxyl group, acyloxy group, and alkyloxy groups and cyclodextrin by the irradiation of an inclusion compound comprised of 7-substituted norbornadiene represented by the general formula:



wherein R has the same meaning as described above and cyclodextrin with light.

4,502,931

PROCESS FOR THE PRODUCTION OF ION EXCHANGE MEMBRANES WITH COATING FOR ELECTROLYSIS

Hiroshi Asano, Chiba; Takayuki Shimamune, Tokyo, and Kazuhiro Hirao, Kanagawa, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed Apr. 7, 1983, Ser. No. 483,014
Claims priority, application Japan, Apr. 9, 1982, 57-58197
Int. Cl.³ C23C *15/00*; C25B *13/00*
U.S. Cl. 204—192 C **3 Claims**

1. A process for the production of an ion exchange membrane with a coating thereon for use in electrolysis, comprising:

(1) coarsening the surface of said ion exchange membrane by ion etching so that the etching depth ranges from about 0.1 to 20μ and,

(2) thereafter, coating the thus-coarsened surface with a substance selected from the group consisting of carbon, graphite, and tantalum oxide.

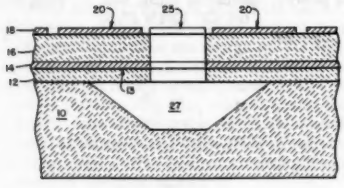
3. The process as claimed in claim 1, wherein the coating of the substance is performed by a vacuum sputter process.

4,502,932

ACOUSTIC RESONATOR AND METHOD OF MAKING SAME

Gerald R. Kline, and Kenneth M. Lakin, both of Ames, Iowa, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 13, 1983, Ser. No. 541,608
Int. Cl.³ C23C *15/00*
U.S. Cl. 204—192 EC **10 Claims**



1. A method of making an acoustic wave resonator comprising:

providing a reactive sputtering system having a chamber;

providing an aluminum target and a GaAs substrate in said chamber;

providing an atmosphere of N_2 in said chamber and sputtering said target to deposit a first layer comprising AlN on said substrate;

providing an atmosphere of Ar in said chamber and sputtering said target to deposit a second layer comprising Al;

providing an atmosphere of N_2 in said chamber and sputtering said target to deposit a third layer comprising AlN;

providing an atmosphere of Ar in said chamber and sputtering said target to deposit a fourth layer comprising Al, thereby forming a multi-layered composite on the GaAs substrate;

defining an electrode in said fourth layer;

providing a cavity in said composite to provide access to said GaAs substrate;

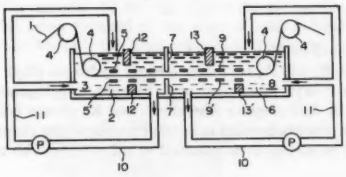
providing an etchant for GaAs through said cavity to said substrate to etch away a portion of said GaAs substrate opposite said electrode to leave a multilayered composite shelf-like structure supported at its perphery by said remaining GaAs substrate.

4,502,933

APPARATUS FOR ELECTROLYTIC TREATMENT TO METAL WEB

Teruo Mori; Hiroshi Shirai; Tsutomu Kakei; Tsuneyasu Matsuhisa, and Masaru Watanabe, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 7, 1982, Ser. No. 447,555
Claims priority, application Japan, Dec. 18, 1981, 56-204747
Int. Cl.³ C25D *7/06*
U.S. Cl. 204—206 **1 Claim**



1. An apparatus for the electrolytic treatment of a metal web comprising first and second adjacent electrolyzers each adapted to be filled with a first and second electrolyte, respectively, and separated by an apertured partition, means for transporting a metal web through said first and second electrolyzers and said apertured partition along a horizontal path adapted to be immersed in said first and second electrolytes, a plurality of pairs of first electrodes located in said first electrolyzer on opposite sides of said horizontal path and a plurality of pairs of second electrodes located in said second electrolyzer on opposite sides of said horizontal path, a plurality of first and second insulating members located in said first and second electrolyzers, respectively, and extending transversely of said horizontal path above and below said first and second pairs of electrodes at a level adapted to be immersed within said first and second electrolytes with said insulating members below said electrodes contacting the bottom of said electroylzers and said insulating members above said electrodes adapted to at least be disposed in contact with the surface of said electroylytes, inlet and outlet means provided for each electrolyzer on opposite sides of said insulating members and means for circulating said first and second electrolytes through said respective inlet and outlet means past said insulating members for creating turbulence.

4,502,934

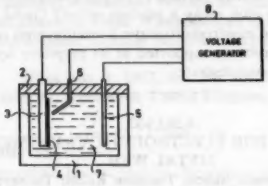
ELECTRODE COMPRISING AN ELECTROCHROME POLYMER FILM AND A DISPLAY DEVICE USING SUCH AN ELECTRODE

Maryse Gazard; Gérard Tourillon, and Francis Garnier, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed May 31, 1983, Ser. No. 499,789
Claims priority, application France, Jun. 1, 1982, 82 09512
Int. Cl.³ C25B *9/00*; G02F *1/01*
U.S. Cl. 204—242 **24 Claims**

1. An electrode comprising a conducting support coated with a polymer film obtained by electrochemical polymerization of at least one monomer M, said polymer corresponding to the general formula $(M^+X^-y)n$; X^- representing an ion coming from the electrolyte used during said polymerization, y the anion proportion with respect to a mole of monomer and n the

degree of polymerization, said monomer having one aromatic heterocycle containing a single hetero-atom said monomer



being substituted by at least one substituent, wherein said monomer corresponds to the chemical formula:

with: X=S or O,

wherein R_1 and R_2 are independently hydrogen alkyl, alkoxy, hydroxyl, aryl, substituted aryl, halogen, trihalogenomethyl, cyano, or dialkylamino wherein R_1 and R_2 are not both H.

9. An electrochemical cell, wherein one of the electrodes is formed by an electrode obtained in accordance with claim 1.

4,502,935

ELECTROLYTIC CELL HAVING A MEMBRANE AND VERTICAL ELECTRODES

Karl Lohrberg, Heusenstamm; Peter Kohl, Neuberg, and Günter Haas, Oberursel, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 24, 1983, Ser. No. 507,840

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1982, 3223701

Int. Cl.³ C25B *9/00, 9/04*

U.S. Cl. 204—253 **4 Claims**

1. A membrane electrolysis cell comprising:

rectangular frames disposed virtually vertically;

the frames having electrodes of one polarity disposed generally vertically and each subdivided horizontally into a plurality of substantially horizontal strips spanning said frames;

respective membranes extending along each of said frames and juxtaposed to a said electrode of one polarity thereof;

respective electrodes of opposite polarity in said frames disposed substantially vertically and each juxtaposed with said membranes whereby each said membrane is deformable toward a said electrode of opposite polarity of an adjacent frame, each of said electrodes of said opposite polarity being subdivided vertically into a plurality of vertical strips spanning said frames; and

conductors designed as springs located in said frames pressing outwardly against the strips of at least one of the electrodes juxtaposed with each membrane to deform the strips toward the strips of the other electrode juxtaposed therewith.

4,502,936

ELECTRODE AND ELECTROLYTIC CELL

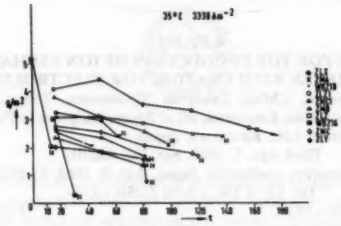
Peter C. S. Hayfield, Church Garth, England, assignor to IMI Kynoch Limited, Birmingham, England

Filed Nov. 20, 1981, Ser. No. 323,579

Claims priority, application United Kingdom, Nov. 26, 1980, 8037933

Int. Cl.³ C23F *13/00*; C25B *11/08*

U.S. Cl. 204—290 F **8 Claims**



1. A method of manufacturing an electrode for use in an electrolytic cell, which method includes the steps of forming on the surface of a titanium substrate a coating by:

i. forming a layer of an oxide of a metal chosen from the group titanium, tantalum, zirconium, hafnium and niobium on the titanium surface,

ii. heat treating the layer in a vacuum or in a non-oxidising atmosphere, said atmosphere being substantially hydrogen-free, at a temperature and for a time sufficient for the titanium partially to reduce the oxide,

iii. applying to the oxide layer a layer of an anodically active material.

4,502,937

OPTICAL FIBER JOINT TYPE ION-CONCENTRATION MEASUREMENT APPARATUS

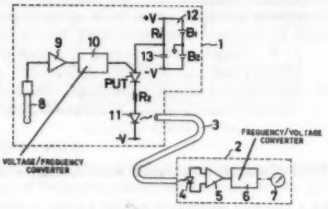
Taizo Yagi, Kyoto, Japan, assignor to Horiba, Ltd., Kyoto, Japan

Filed Sep. 2, 1983, Ser. No. 528,985

Claims priority, application Japan, Sep. 17, 1982, 57-162870

Int. Cl.³ G01N *27/50*

U.S. Cl. 204—406 **4 Claims**



1. An optical fiber joint type ion-concentration measurement apparatus having a transmitting side in which electrical signals which are detected by an ion selective electrode are transformed into optical signals and the transformed optical signals are transmitted to a receiving side of said measurement apparatus by means of an optical fiber, wherein said transmitting side comprises:

an ion selective electrode, a voltage/frequency converter coupled to said electrode for frequency modulating signals which are detected by said ion selective electrode, a switch means coupled to said converter and switched on or off by output signals from said converter, an LED

device connected in series with said switch means to form a series circuit, a charging circuit including an electrical power source and a charging-discharging capacitor having said series circuit constituting of said switch means and said LED used as a discharging circuit, wherein electrical charge which is stored in said capacitor is discharged when said switch means is switched on so as to cause said LED to emit light, and wherein the light emitted from said LED is transmitted to said receiving side by means of said optical fiber.

4,502,938

ENCAPSULATED CHEMORESPONSIVE MICROELECTRONIC DEVICE ARRAYS

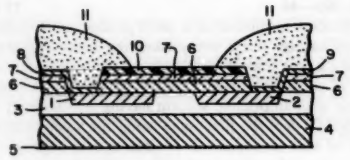
Arthur K. Covington, Newcastle upon Tyne, and Alastair Sibbald, Whitley Bay, both of England, assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 8, 1982, Ser. No. 366,722

Claims priority, application United Kingdom, Apr. 9, 1981, 8111199

Int. Cl.³ G01N *27/46*

U.S. Cl. 204—412 **1 Claim**



1. An array of chemical-responsive field-effect transducers adapted to operate in a mode selected from depletion-mode and enhancement/depletion-mode, comprising: a chip of semiconductor material having at least three pairs of adjacent, triangular diffusion regions of a certain doping polarity located at the surface, each said pair of diffusion regions being separated by a channel of the same doping polarity, at least one material selected from electrical insulator material and ion-barrier material overlying each of the aforementioned channel regions; an elongated rectangular coating of electroactive material overlying each said insulator and/or ion barrier, such that the electroactive material will interact with substances to which it is exposed and control the charge-carrier density in the aforementioned channel, each said pair of diffusion regions and associated channel region being symmetrically oriented about a common point on said chip, said elongated coatings extending radially from said common point, and a coating of polymeric material encapsulating the surface of said chip except for a circular region about said point which includes said plurality of pairs of diffusion regions.

4,502,939

ELECTROCHEMICAL OXYGEN SENSOR, PARTICULARLY FOR ANALYSIS OF COMBUSTION CASES FROM INTERNAL COMBUSTION ENGINES

Gerhard Holfelder, Ditzingen, and Klaus Müller, Tamm, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 260,258, May 4, 1981, abandoned. This application Jan. 19, 1984, Ser. No. 572,595

Claims priority, application Fed. Rep. of Germany, May 10, 1980, 3017947

Int. Cl.³ G01N *27/46*

U.S. Cl. 204—429 **12 Claims**

1. Electrochemical sensor to determine the oxygen content of test gases, particularly to analyze exhaust gases from a combustion process, especially from an internal combustion engine, having

a tubular housing (12);

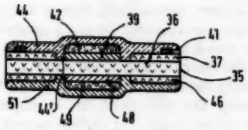
a plate-like sensing element (11, 511) retained in the housing and having a sensing end portion (11/1; 511/1) adapted to be exposed to the gas to be analyzed, an intermediate holding portion (11/2) and a connecting portion (11/3) adapted to be connected to an electrical circuit (B, E),

wherein the sensing end portion of the plate-like sensing element comprises an oxygen ion conductive solid electrolyte plate-like carrier (35) having terminal edges;

two layer-like porous electrodes (39, 48; 539, 548), applied to the plate-like carrier and positioned inwardly of the edges of the solid electrolyte plate-like carrier (35), one of the electrodes forming a sensing electrode and being in communication with the gas to be analyzed,

and comprising, in accordance with the invention, a sintered, porous, gas-pervious filler material (42, 49) covering at least one of the electrodes (39, 48; 539, 548) and a portion of the carrier, and extending towards and adjacent to a neighboring edge (40) of the carrier;

and a gas-tight covering (44, 51) placed over said porous filler material and the at least one electrode covered by said filler material (42, 49), the edge of the gas-tight covering (44) being forward of the edge of said at least one electrode beneath the filler material to force the gas to



flow at least for some distance along the plane of the carrier and hence over said at least one layer-like porous electrode beneath the porous filler material, said gas-tight covering being mechanically supported by the porous filler material over the layer-like electrode applied to the plate-like carrier, and forming a tunnel cover over said porous filler material, the respective electrode therebeneath and said portion of the carrier, the tunnel being filled by said porous filler material, said tunnel extending essentially parallel to the major surface of said electrolyte plate-like carrier (35);

said gas-tight covering leaving exposed a portion of the sintered, porous, gas-pervious filler material in a region adjacent said edge (40) to expose said filler material to the gas to be applied to the electrode in, and beneath the tunnel, to permit access of said gas to the filler material and to conduct said gas along the surface of said carrier portion and hence to the electrode positioned beneath the tunnel cover,

said gas-tight covering protecting the electrode and isolating the porous filler material over the carrier portion and over the electrode, and hence the electrode, from contact with gas surrounding said sensing elmeent except at the zone of exposure adjacent said edge.

4,502,940

METHOD FOR EXTRACTING CAKING COALS

Michael J. Finn, Cheltenham, and Robert D. Hughes, Strensham, both of England, assignors to Coal Industry (Patents) Limited, London, England

Filed Oct. 5, 1983, Ser. No. 539,172

Claims priority, application United Kingdom, Nov. 19, 1982, 8233126

Int. Cl.³ C10G *1/00*

U.S. Cl. 208—8 LE **6 Claims**

1. A continuous method for the supercritical gas extraction of strongly caking coals, consisting of extracting in a first stage finely divided strongly caking coal with a liquid solvent at a

pressure above its critical pressure and at a temperature in the range 380° C. to 420° C. and for a time sufficient to extract at least a major proportion of the extractable constituents at the first stage temperature, to yield an extract and a solid residue, and in a second stage extracting the solid residue with a solvent being or having a major proportion thereof in the supercritical gas phase at a temperature in the range 440° C. to 490° C., separating the second stage solvent and extract from the second stage residue, and recovering the extract or combined extract from the solvent by temperature or pressure drop.

4,502,941

NON-AQUEOUS HYDROGENATION OF SOLID CARBONACEOUS MATERIAL

Kenneth R. Dymock, and Malcolm C. E. Bell, both of Oakville, Canada, assignors to Inco Limited, Toronto, Canada

Continuation-in-part of Ser. No. 469,539, Feb. 24, 1983, abandoned. This application Jan. 31, 1984, Ser. No. 575,349

Claims priority, application United Kingdom, Feb. 24, 1982, 8205497

Int. Cl.³ C10G *1/04, 1/08*

U.S. Cl. 208—10 **5 Claims**

1. A direct, pH independent, nonaqueous process of hydrogenating and liquefying solid carbonaceous material, the process comprising:

(a) forming a slurry substantially free of water by combining the carbonaceous material, oil and a catalyst derived from $Fe_2(CO)_9$ which is also combined with said slurry;

(b) heating the slurry to about 400°–500° C.;

(c) pressurizing the slurry to about 500–5,000 psi;

(d) performing the process in an atomsphere consisting essentially of hydrogen and carbon monoxide, and

(e) separating the resultant liquid from the solid residue.

4,502,942

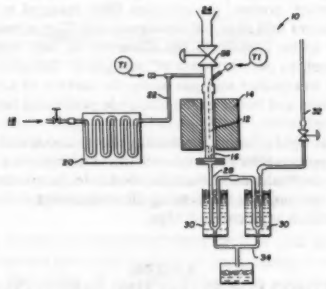
ENHANCED OIL RECOVERY FROM WESTERN UNITED STATES TYPE OIL SHALE USING CARBON DIOXIDE RETORTING TECHNIQUE

Sunggyu Lee, Copley, Ohio, and Rajendra Joshi, Arlington, Tex., assignors to The University of Akron, Akron, Ohio

Continuation-in-part of Ser. No. 488,441, Apr. 25, 1983, abandoned. This application Feb. 8, 1984, Ser. No. 578,360

Int. Cl.³ C10G *1/00*

U.S. Cl. 208—11 R **9 Claims**



1. A process for pyrolysis of oil shale comprising:

crushing a quantity of Western United States type oil shale to a particle size from about −20+40 mesh to 10 cm. in diameter;

heating said shale at a rate from about 2° C./min to 20° C./min until a final temperature of between 400° C. to 700° C. is achieved, maintaining said shale at said final temperature and causing a pyrolysis reaction in said shale thereby at a pressure of from about 0.5 to about 1.5 atmospheres;

releasing gaseous and liquid product from said shale by means of said pyrolysis reaction;

conveying said product from said shale by means of a stream consisting essentially of heated carbon dioxide gas, at a temperature from 400° to 700° C., passed through said shale at a rate from about 0.5 cc/sec/100 cc of reactor volume at standard temperature and pressure to about 10 cc/sec/100 cc of reactor volume at standard temperature and pressure and

cooling said product and thereby liquefying the condensable portions thereof.

4,502,943

POST-TREATMENT OF SPINNABLE PRECURSORS FROM PETROLEUM PITCH

Ghazi Dickakian, Greenville, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 28, 1983, Ser. No. 479,177

Int. Cl.³ C10C *1/20, 1/18, 3/08*

U.S. Cl. 208—44 **12 Claims**

1. A process for preparing a pitch product suitable for spinning into carbon fibers comprising the following steps: (a) subjecting a heat soaked, distillable oil removed carbonaceous residue of petroleum origin to a two-stage solvent separation treatment with an organic solvent having a solubility parameter of about 8–9.5, the first stage being the solubilization of a fraction of said carbonaceous residue in said organic solvent and separation of insolubles therefrom, the second stage being the separation of a solvent insoluble fraction from the resulting solvent phase; and (b) thereafter devolatilizing the separated solvent insoluble fraction at a temperature of about 150°–380° C. and under a reduced pressure of about 1–6000 mm Hg to reduce volatiles and to obtain said pitch product.

4,502,944

FRACTIONATION OF HEAVY HYDROCARBON PROCESS MATERIAL

Stephen R. Nelson, Edmond, Okla., assignor to Kerr-McGee Refining Corporation, Oklahoma City, Okla.

Filed Sep. 27, 1982, Ser. No. 424,290

Int. Cl.³ C10C *1/18, 3/08*

U.S. Cl. 208—45 **4 Claims**

1. A method of separating a process material comprising oils, resins and asphaltenes into at least three fractions, comprising:

mixing the process material in a mixing zone with a solvent selected from the group consisting of paraffinic hydrocarbons having between about 3 and about 8 carbon atoms, in a solvent:process material ratio of at at least about 3:1;

introducing the process material-solvent mixture into a first separation zone maintained at a pressure at or above the critical pressure of the solvent, and at a temperature within about 30° F. of the critical temperature of the solvent, to form an asphaltene-rich first heavy fraction and a resin-rich intermediate fraction, separated by a first liquid-liquid interface, and to form a first light fraction rich in solvent and oils, separated from the intermediate fraction by a second liquid-liquid interface;

withdrawing the first heavy fraction from the first separation zone;

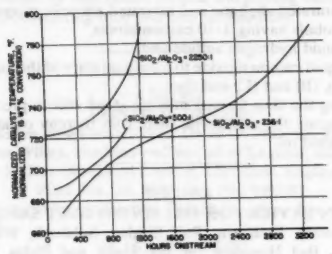
withdrawing the intermediate fraction from the first separation zone; and

introducing the first light fraction into a second separation zone to separate a second heavy fraction, rich in oils, and a second light fraction, rich in solvent.

4,502,945
PROCESS FOR PREPARING OLEFINS AT HIGH PRESSURE

Hazel C. Olbrich, Rodeo, and Dennis J. O'Rear, Petaluma, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jun. 9, 1982, Ser. No. 386,551
Int. Cl.[3] C10G *11/05, 11/02;* C07C *4/06*
U.S. Cl. 208—120 6 Claims

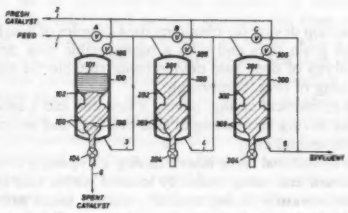


1. A process for producing olefins from normal paraffins, slightly branched paraffins and mixtures thereof, comprising contacting a feed, which comprises said paraffins, with a catalyst, which comprises an intermediate pore size silicaceous crystalline molecular sieve having a silica:alumina mole ratio from about 175:1 to about 300:1, under olefin-producing reaction conditions comprising a pressure from about 30 psia (2.07 bar) to about 115 psia (7.9 bar).

4,502,946
PROCESS FOR THE COMPLETE REPLACEMENT OF PARTICLES IN VESSELS

Gerrit J. Pronk, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 28, 1984, Ser. No. 594,131
Claims priority, application United Kingdom, Mar. 28, 1983, 8308473
Int. Cl.[3] C10G *45/00*
U.S. Cl. 208—152 8 Claims



1. Process for the complete replacement under operating conditions of particles in a vessel provided with a feed inlet, a particle outlet and an effluent outlet, which comprises:

withdrawing particles from said vessel under operating conditions, including passing feed through the vessel during withdrawal of particles;

by-passing the vessel with a portion of the feed when the particle volume present in the vessel is no more than 20% of the initial particle volume;

withdrawing the remainder of the particles from the vessel;

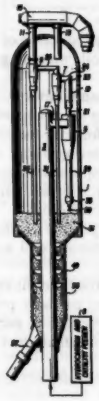
closing off the feed by-pass and again passing all feed through said vessel;

while adding particles through a separate particle inlet or through the feed inlet to said vessel, until the desired particle volume is reached.

4,502,947
CLOSED CYCLONE FCC CATALYST SEPARATION METHOD AND APPARATUS

James H. Haddad, Princeton Junction; Hartley Owen, Belle Mead, and Klaus W. Schatz, Skillman, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 21, 1984, Ser. No. 612,177
Int. Cl.[3] C10G *11/18;* B01J *8/24*
U.S. Cl. 208—161 9 Claims



8. A method of fluid catalytic cracking of a hydrocarbon feed comprising the steps of:

passing a mixture, as a suspension, of said hydrocarbon feed and a catalyst through a riser conversion zone contained within a reactor vessel and cracking said hydrocarbon feed in the riser conversion zone;

passing the mixture from the riser conversion zone to a riser cyclone separator positioned within the reactor vessel through a first enclosed conduit, the first enclosed conduit completely separating the mixture from the atmosphere of the reactor vessel;

separating at least a portion of the catalyst from the mixture in the riser cyclone separator;

passing a gaseous effluent from the riser cyclone separator to a primary cyclone separator positioned within the reactor vessel through a second conduit;

passing the separated catalyst to a catalyst stripping zone positioned within the reactor vessel, said stripping zone using a stripping gas to remove hydrocarbons entrained with the separated catalyst;

passing the catalyst removed from the mixture, by the riser cyclone separator, through a dipleg of said riser cyclone separator to a cyclone dipleg seal which holds catalyst so that it surrounds a dipleg opening, said dipleg seal comprising vertical side walls, a portion of which overlaps a portion of said riser cyclone separator dipleg to form an annular port located above the opening of said riser cyclone separator dipleg, and a bin comprising slanted walls attached to the lower edge of the side walls, the bin having at least one opening at its lower end;

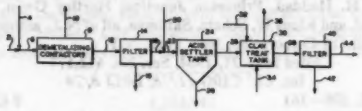
passing the cracked hydrocarbons, as an effluent from said primary cyclone separator, to a downstream fractionation apparatus; and

passing the separated catalyst from said stripping zone to a regeneration vessel.

4,502,948
RECLAIMING USED LUBRICATING OIL

Donald C. Tabler, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 30, 1984, Ser. No. 595,133
Int. Cl.³ C10M *11/00*
U.S. Cl. 208—183 **16 Claims**



10. A process for the production of essentially pure oil stock from a used lubricating oil containing undesirable components comprising:

(a) contacting said used lubricating oil with an aqueous solution of a treating agent capable of reacting with essentially all of the ash-forming metal constituents in said used lubricating oil rendering them removable under conditions sufficient to disperse said agent in said lubricating oil and reacting a sufficient amount of said agent with said metals of said lubricating oil;

(b) removing a major portion of the water from the mixture resulting from combining said aqueous solution and said lubricating oil;

(c) separating solids from the oil resulting from step (b) to obtain a demetallized partially purified oil;

(d) contacting said demetallized partially purified oil of step (c) with a relatively small amount of concentrated sulfuric acid;

(e) settling the mixture of step (d) to form an oil phase and an acid phase;

(f) contacting the resulting settled oil from step (e) with at least one adsorbent selected from the group consisting of activated carbon, silica gel, clay, bauxite and alumina;

(g) separating the oil and the particles from step (f) by filtration resulting in a finished clear product.

4,502,949
CATALYTIC OXIDATION OF MERCAPTAN IN PETROLEUM DISTILLATE

Robert R. Frame, Glenview; Russell W. Johnson, Villa Park, and Bruce E. Staehle, Buffalo Grove, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Feb. 15, 1984, Ser. No. 580,490
Int. Cl.³ C10G *27/10, 29/00*
U.S. Cl. 208—207 **12 Claims**

1. A process for sweetening a sour hydrocarbon fraction containing mercaptan which comprises reacting mercaptans contained in said hydrocarbon fraction with an oxidizing agent by contacting said hydrocarbon fraction and said oxidizing agent with a supported metal chelate mercaptan oxidation catalyst and anhydrous ammonia in the absence of an aqueous phase.

4,502,950
PROCESS FOR THE SOLVENT DEASPHALTING OF ASPHALTENE-CONTAINING HYDROCARBONS

Masaki Ikematsu; Isao Honzyo, and Kazuo Sakai, all of Yokohama, Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 460,446, Jan. 24, 1983, abandoned. This application Jan. 31, 1984, Ser. No. 575,717
Claims priority, application Japan, Jan. 15, 1982, 57-8774; Feb. 15, 1982, 57-21206
Int. Cl.³ C10G *21/40*
U.S. Cl. 208—309 **8 Claims**

1. A continuous process for solvent deasphalting asphaltene-containing hydrocarbons which comprises

(I) mixing

(A) 100 parts by weight of asphaltene-containing hydrocarbons with

(B) 0.005–0.5 parts by weight of at least one member selected from the group consisting of amorphous silicon dioxides and silicate compounds and

(C) 50–2,000 parts by weight of at least one member selected from the group consisting of the following solvents (1)–(4):

(1) aliphatic and alicyclic hydrocarbons having 3–20 carbon atoms,

(2) saturated aliphatic and saturated alicyclic monohydric alcohols having 1–10 carbon atoms,

(3) liquid hydrogen sulfide and

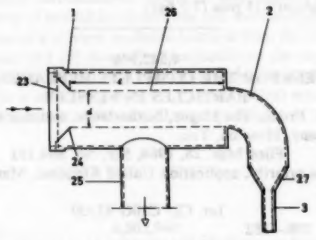
(4) liquid carbon dioxide to form a mixture of the materials (A), (B) and (C) and then

(II) making the thus formed mixture stand still to precipitate and separate the asphaltene therefrom thereby obtaining a deasphalted oil.

4,502,951
SUCTION DEVICE FOR OBTAINING DUST SAMPLES

Rainer Koenig, Eschborn; Rolf Sieglen, Sulzbach; Wolfgang Weisser, Bad Homburg von der Hohe, and Helga Heide, Kelkheim, all of Fed. Rep. of Germany, assignors to Luossavaara-Kiirunavaara AB, Stockholm, Sweden

Division of Ser. No. 205,199, Jan. 15, 1981, Pat. No. 4,482,864. This application Dec. 21, 1982, Ser. No. 451,948
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1980, 3001704
Int. Cl.³ B07B *7/06*
U.S. Cl. 209—21 **2 Claims**



1. Suction device for obtaining dust samples of nearly homogeneous grain sizes and with a reproducible bulk density for the analysis of ores, said device being suitable for use during the mining of ores, comprising:

(a) a cylindrical casing, having a first end and a second end, and having an opening at said first end and an opening at said second end;

(b) a cylindrical sieve insert, having an opening at each end thereof and being coaxially located within said casing;

(c) an inwardly-facing conically-shaped insert provided at said first end of said casing, said conically-shaped insert providing flow communication between said first end of said casing and said sieve insert;

(d) a suction pipe socket located laterally on said casing, said suction pipe socket adapted for attachment to suction means, and when said suction means is attached and operating, a suction is drawn in said cylindrical sieve insert, said conically-shaped insert and said first end of said casing, and through a filter;

(e) said filter located over the mouth of said conically-shaped insert, said filter only allowing the passage of a gasious suspension of said dust;

(f) a downwardly-curved dust-conducting tube, having a first end and a second end, and said first end thereof being in direct communication with the end of said sieve insert opposite to said first end of said casing;

(g) a tube for a dust sample, which is in direct communica-

tion with said second end of said dust-conducting tube, whereby said dust is drawn into said first end of said casing and through said filter, said dust being composed of smaller particles and larger particles, said inwardly-facing conically-shaped insert accelerates said dust particles which have passed through said filter, said smaller particles of said dust following the deflection of the air flow caused by the lateral suction through said suction pipe socket, and the larger particles of said dust not being deflected by said lateral suction and passing through said dust-conducting tube into said sample tube.

4,502,952
CONTROL DEVICE

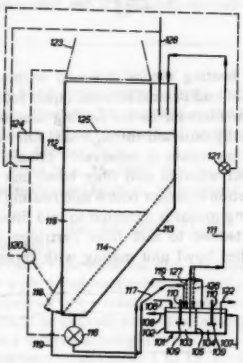
David Naden, Stockton-on-Tees; David G. Webster, Yarm, and Gordon Willey, Stockton-on-Tees, all of England, assignors to Davy McKee (Stockton) Limited, Cleveland, England

Filed Jun. 28, 1983, Ser. No. 508,597

Claims priority, application United Kingdom, Jun. 28, 1982, 8218634

Int. Cl.³ B01D *15/02*

U.S. Cl. 210—86 **8 Claims**



1. In or for an adsorbent-in-pulp contactor in which an adsorbent of predetermined particle size selected from resins and carbon is contacted in a plurality of stages with a pulp comprising ore particles having a particle size less than that of said adsorbent particles suspended in a liquid suspending agent and in which adsorbent is passed from stage to stage in countercurrent to the direction of flow of pulp through the contactor, the improvement comprising a control device for controlling the transfer of adsorbent to and from the individual stages of the contactor comprising a vessel for receiving and containing adsorbent-pulp mixture, said vessel having an inclined screen mounted therein, said inclined screen being adapted to retain adsorbent particles thereon but allow passage of pulp therethrough, transfer means for transferring adsorbent-pulp mixture to said vessel from a selected stage of the contactor and delivering same onto said screen thereof, pulp return means for returning to the contactor pulp that has passed through said screen, outlet means adjacent the lower end of said screen for recovery of drained adsorbent solids retained on said screen, valve means for controlling discharge of drained adsorbent solids from said vessel, volume measuring means for measuring the volume in the vessel of at least one material selected from drained adsorbent solids and adsorbent-pulp mixture, and control means for interrupting operation of said transfer means and for controlling opening of said valve means in dependence on an output signal from said volume measuring means.

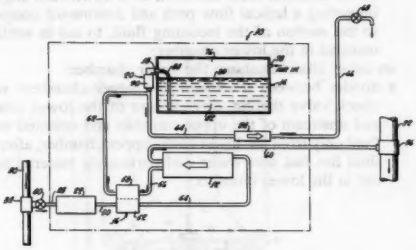
4,502,953
WATER PURIFYING APPARATUS WITH AIR CHECK VALVE AND FILTER CONDITION INDICATION

Robert E. Marsh, Racine, and Michael H. Colburn, Brookfield, both of Wis., assignors to Plasworld, Inc., Racine, Wis.

Filed Sep. 2, 1983, Ser. No. 529,134

Int. Cl.³ C02B *1/82*

U.S. Cl. 210—94 **4 Claims**



1. Water purification apparatus which comprises:

(a) a pressure vessel for storing purified water, said vessel having a purified water inlet and a water discharging outlet;

(b) filtering means for removing impurities from water, said filtering means having an unpurified water inlet and a purified water outlet;

(c) means for connecting the purified water outlet of the filtering means to the inlet of said vessel for delivery of filtered water from the filtering means to the vessel, and for connecting the unpurified water inlet of the filtering means to a source of pressurized, unfiltered water;

(d) means enabling pressurization of said vessel to a preselected operating pressure, said pressurization means causing a vessel pressurizing gas to be in direct contact with purified water in the vessel;

(e) means connected to the outlet of said vessel for enabling withdrawing of purified water therefrom without substantial reduction of pressure in the vessel;

(f) means, responsive to the flowing of purified water from the filtering means to said vessel, for enabling the determination of the filtering condition of the filtering means; and

(g) means connected to the outlet of the vessel for automatically sealing off the water withdrawing means when withdrawal of purified water from the vessel causes the level of purified water in the vessel to decrease to a preselected minimum level, the escape of pressurizing gas from the vessel through the water withdrawing means being thereby prevented, the automatic sealing means comprising a valve chamber in fluid communication with the inside of the vessel, said chamber being formed having a valve seat, and further comprising a float valve disposed in the valve chamber, the float valve having a specific gravity less than that of water but greater than that of the gas used to pressurize the vessel, the valve thereby floating at the surface of water in the chamber, the valve being configured for providing a water and gas-tight seal at the valve seat when the water level in the vessel decreases to said preselected minimum level.

4,502,954
COMBINATION FUEL FILTER AND WATER SEPARATOR

James B. Druffel, P.O. Box 535, Hylano, N.Y. 12528

Filed Jul. 19, 1982, Ser. No. 399,459

Int. Cl.³ B01D *27/08*

U.S. Cl. 210—136 **8 Claims**

1. A filter and water separator for lighter-than-water fluid, comprising:

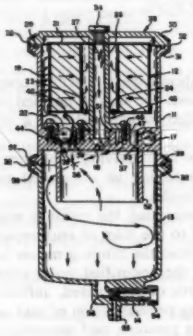
a frame;

a fluid inlet connected to the frame;

a circular lower chamber communicating directly with and positioned below the inlet, the inlet being disposed tangentially to the lower chamber such as to induce a swirling, arcuate flow to the fluid to separate out water and particulate material from the fluid centrifugally so that they settle at the bottom of the lower chamber, and further including a ramp-like conduit extending generally helically into the lower chamber from the inlet, on a downward angle, for imparting a helical flow path and downward component to the motion of the incoming fluid, to aid in settling of material in the lower chamber;

an upper chamber above the lower chamber;

a divider between the lower and upper chambers with a check valve therein, downstream of the lower chamber and upstream of the upper chamber and oriented to pass fluid only from the lower to the upper chamber, after such fluid has had said water and particulate material settled out in the lower chamber;



a generally circular open-bottomed flow shield collar extending downwardly from the frame part way into the lower chamber, just inside the helical flow path of the incoming fluid and surrounding the check valve, so that the helically moving incoming fluid is isolated from the check valve initially, then flows up into the space defined by the collar and through the check valve;

a fluid outlet connected at a downstream end of the upper chamber;

a filter element in the upper chamber, positioned between the check valve and the fluid outlet in the path of fluid flow; and

access means for opening the upper chamber to service the filter element;

whereby particulate material and water may be separated out of the fluid while it swirls at relatively low velocity in the lower chamber, before the fluid flows through the check valve, which would otherwise be subject to fouling by the particulate material, and the check valve prevents outflow of fluid from the chamber by gravity when the access means is opened.

4,502,955

FILTER ASSEMBLY

Richard E. Schaupp, Modesto, Calif., assignor to Racor Industries, Inc., Modesto, Calif.

Filed Apr. 14, 1983, Ser. No. 484,904

Int. Cl.³ B01D *35/18*

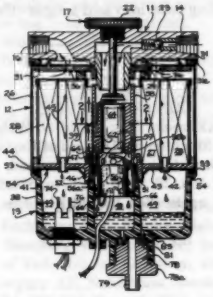
U.S. Cl. 210—149 **21 Claims**

1. A fuel filter assembly comprising:

(a) a filter cartridge having an annular filter media within a filter casing, and operative to filter fuel as it proceeds on a radially outward flow path through said filter media;

(b) a mounting unit disposed above said filter cartridge and having said filter cartridge removably attached thereto, and including an inlet flow passage for passing fuel going into said filter cartridge to inside a central internal liquid receiving zone of said annular filter media and an outlet flow passage for passing fuel coming out of said fuel cartridge after radial passage through said annular filter media;

(c) a filter bowl unit removably attached underneath said filter cartridge and operative to collect contaminants separated from fuel by said filter cartridge; and



(d) an electric heating means disposed within said filter casing inside of said central internal liquid receiving zone of said annular filter media for heating fuel just before it proceeds radially outward through said filter media; and

wherein said heating means is removably connected to said filter cartridge, and wherein said fiber bowl unit includes a contaminant collection chamber below said heating means, and wherein said heating means is mounted to said filter bowl unit and threadably attached to said filter cartridge by way of threads on said filter bowl unit mating with threads on said filter cartridge.

4,502,956

FILTER ASSEMBLY

Michael E. Wilson, Modesto; David R. Olson, Turlock; Walter H. Stone, and Robin B. MacDonald, both of Modesto, all of Calif., assignors to Racor Industries, Inc., Modesto, Calif.

Continuation of Ser. No. 351,761, Feb. 24, 1982, abandoned.

This application Jan. 3, 1984, Ser. No. 568,271

Int. Cl.³ B01D *27/08*

U.S. Cl. 210—248 **29 Claims**

1. A filter assembly adapted to remove contaminants from liquid fuel comprising:

(a) a body;

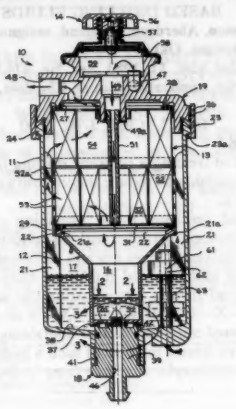
(b) a first filter media and a second filter media disposed within said body;

(c) a contaminant collection bowl means supported by said body and defining first and second collection zones, each collection zone disposed to collect liquid contaminants as fuel passes through the assembly, said first collection zone is upstream of both said first and second filter media and said second collection zone is downstream of said first filter media and upstream of said second filter media; and

(d) means common to both said first and second collection zones for simultaneously draining contaminants from said first and second collection zones, and

wherein, in operation, said first and second collection zones are completely walled off from each other with the

only communication between said first and second collection zones being through said body by way of a first contaminant outlet and at least one second contaminant outlet.



4,502,957

PROCESS FOR PURIFYING ORGANIC SOLUTIONS

Nikolaus Jehle, Pratteln; Markus Thüer, and Ewald Losert, both of Rheinfelden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 15, 1982, Ser. No. 441,334

Claims priority, application Switzerland, Nov. 24, 1981, 7506/81

Int. Cl.³ B01D *15/00*

U.S. Cl. 210—690 **13 Claims**

1. A process for the removal of a photopolymerisable resin polymer or a photopolymerisable resin polymer and additives for said polymer from a solution of said polymer or polymer and additives in an organic solvent by adsorption, wherein the polymer has a molecular weight in the range of 1000 to 500,000 and the solution contains from 1 to 150 g of polymer per liter of solvent, which comprises

bringing the solution at 20° to 150° C. into contact with 10 to 500 g of activated carbon per liter of solvent,

adsorbing the polymer or polymer and additives onto the carbon and,

subsequently isolating the solvent.

4,502,958

METHOD AND DEVICE FOR THE SEPARATION OF SUSPENDED SOLIDS IN WASTE WATER

Takahisa Sasaki, 821-114 Furukawa-cho, Matsuyama-shi, Ehime, Japan

Filed Dec. 1, 1982, Ser. No. 445,693

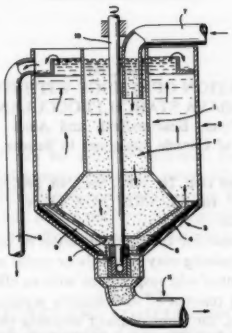
Claims priority, application Japan, Dec. 1, 1981, 56/194110

Int. Cl.³ B01D *35/06;* **B03C** *1/10*

U.S. Cl. 210—695 **23 Claims**

1. Method for the separation of suspended solids in waste water, which comprises precluding a requirement for adding coagulants by adding a magnet-sensitive powder to the waste water containing suspended solids, forming agglomerates by adhesion of the suspended solids with the magnet-sensitive powder, whereby the suspended solids are increased in weight to promote gravity settling, charging the waste water containing the agglomerates into a separation tank having one or more magnets attached to its bottom and then passing the waste water containing the agglomerates through a relatively narrow passage formed in the face of the magnet, so that the agglomerates are attracted by the magnet.

4. Device for the separation of suspended solids in waste water, which comprises elements designed to preclude a requirement for coagulation addition, including a separation tank consisting of an inner tank and an outer tank, said inner tank for charging water containing agglomerates formed by adhesion of suspended solids with a magnet-sensitive powder; one or more magnets attached to a surface of a reverse conical bottom of the outer tank; an opening at a central part of the bottom of the inner tank arranged relatively near to the magnet to form



a passage through which the waste water is passed from the inner tank to the outer tank; a scraper rotating in contact with the surface of the magnet and for scraping off the agglomerates attracted to the magnet; a sludge outlet for removing the scraped agglomerates at the central part of the conical bottom of the outer tank; an inlet pipe for waste water at an upper part of the inner tank; and an outlet pipe for supernatant at an upper part of the outer tank.

4,502,959

PURIFICATION OF SECONDARY RECOVERY WATERFLOOD LIQUIDS

Gerald D. Hansen, Holicong, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 5, 1983, Ser. No. 510,499

Int. Cl.³ C02F *1/56*

U.S. Cl. 210—705 **6 Claims**

1. A method of removing a polysaccharide gum from an aqueous waterflood liquid used in secondary recovery operations comprising contacting the gum-containing aqueous liquid with a water-soluble copolymer of styrene and maleic anhydride having a molecular weight in the range of about 500 to 5000 and a styrene to maleic anhydride molar ratio in the range of 1:1 to about 10:1 in an amount sufficient to form an agglomerate of said polysaccharide gum and said copolymer and removing the agglomerate from the aqueous liquid.

4,502,960

DESTABILIZATION OF SLUDGE WITH HYDROLYZED DASHEEN STARCH FLOCCULANTS

Raymond N. Yong, Beaconsfield, and Amar J. Sethi, Baie D'Urfe, both of Canada, assignors to Suncor, Inc., Toronto, Canada

Filed Dec. 16, 1983, Ser. No. 562,354

Int. Cl.³ C02F *1/54, 11/14*

U.S. Cl. 210—728 **5 Claims**

1. In the process for the destabilization of colloidal sludge suspensions containing clay minerals or metal oxides-hydroxides, by treatment of said suspensions with an effective amount of a flocculating reagent to substantially separate water from suspended solids, the improvement wherein the flocculating reagent is a hydrolyzed dasheen starch obtained by the aqueous hydrolysis of the starch in the presence of about 1 to 30 gms per 100 gms of starch of insoluble metal salts formed in

situ, and wherein the salts employed during the hydrolysis to form said insoluble salts are the soluble salts of metals selected from the group consisting of sodium, potassium, ammonium magnesium, calcium, and aluminum, and respective anions of said soluble salts are selected from the group consisting of sulfates, acetates, chlorides, nitrates, chlorates, bromides, iodides, thiocyanates, and phosphates.

4,502,961

DESTABILIZATION OF SLUDGE WITH HYDROLYZED CASSAVA STARCH FLOCCULANTS

Raymond N. Yong, Beaconsfield, and Amar J. Sethi, Baie D'Urfe, both of Canada, assignors to Suncor, Inc., Toronto, Canada

Filed Dec. 16, 1983, Ser. No. 562,355
Int. Cl.³ C02F *1/54, 11/14*
U.S. Cl. 210—728 **5 Claims**

1. In the process for the destabilization of colloidal sludge suspensions containing clay minerals or metal oxides-hydroxides, by treatment of said suspensions with an effective amount of a flocculating reagent to substantially separate water from suspended solids, the improvement wherein the flocculating reagent is a hydrolyzed cassava starch obtained by the aqueous hydrolysis of the starch in the presence of about 10 to 30 gms per 100 gms of starch of insoluble metal salts formed in situ and wherein the salts employed during the hydrolysis to form said insoluble salts are the soluble salts of metals selected from the group consisting of sodium, potassium, ammonium, magnesium, calcium and aluminum, and respective anions of said soluble salts are selected from the group consisting of sulfates, acetates, chlorides, nitrates, chlorates, bromides, iodides, thicyanates, and phosphates.

4,502,962

HYDROCARBON SOLVENT-BASED DISPERSANT FORMULATION AND ITS USE IN THE DISPERSION OF VISCOUS OIL SPILLS

Kenneth W. Becker; James R. Jackson; Gordon P. Lindblom, and Marjorie A. Walsh, all of Houston, Tex., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Sep. 13, 1982, Ser. No. 416,952
Int. Cl.³ E02B *15/04*
U.S. Cl. 210—749 **7 Claims**

1. A method for dispersing a slick of a heavy oil on water which comprises contacting said oil slick with an effective dispersing amount of a dispersant formulation comprising: 5 to 15 weight percent of a sorbitan monoester of a C_{10}–C_{20} aliphatic monocarboxylic acid; 5 to 15 weight percent of a polyoxyalkylene adduct of a sorbitan monoester of a C_{10}–C_{20} aliphatic monocarboxylic acid said adduct having 6 to 30 polyoxyalkylene units per mole of monoester; 15 to 40 weight percent of a polyoxyalkylene adduct of a sorbitan triester of a C_{10}–C_{20} aliphatic monocarboxylic acid, said adduct having 6 to 30 polyoxyalkylene units per mole of triester; 3 to 15 weight percent of a salt of a dialkyl sulfosuccinate having a critical micelle concentration (at 25° C.) of 0.0005 to 0.005 grams/100 ml; and from 15 to 40 weight percent of an isoparaffinic hydrocarbon solvent having a boiling range of 115° C.–255° C., said weight percent based on the total weight of said composition, wherein said contacting is by means of an aerial spray from an aircraft and said formulation is adjusted to a viscosity of 60 to 150 centistokes measured at 60° F.

4,502,963

USE OF CERTAIN MATERIALS AS THINNERS IN OIL BASED DRILLING FLUIDS

Bobby R. Harmon, Aberdeen, Scotland, assignor to Halliburton Company, Duncan, Okla.

Filed Mar. 11, 1983, Ser. No. 474,614
Claims priority, application United Kingdom, Mar. 11, 1982, 8231375
Int. Cl.³ C09K *3/00, 7/00*
U.S. Cl. 252—8.5 P **20 Claims**

1. A method of treating a returned drilling fluid comprising a water-in-oil emulsion to reduce the viscosity of said returned fluid comprising:

admixing said returned fluid containing colloidally suspended formation particles with an additive comprising a fatty acid polyester in an amount sufficient to reduce the viscosity of said returned fluid, said fatty acid polyester being derived from a hyroxycarboxylic acid of the formula HO—X—COOH wherein X is a divalent saturated or unsaturated aliphatic radical containing at least 8 carbon atoms or from a mixture of such a hydroxycarboxylic acid and a carboxylic acid free from hydroxy groups.

4,502,964

TERPOLYMERS FOR USE AS HIGH TEMPERATURE FLUID LOSS ADDITIVE AND RHEOLOGY STABILIZER FOR HIGH PRESSURE, HIGH TEMPERATURE OIL WELL DRILLING FLUIDS

David M. Giddings, Sugar Land; Donald G. Ries, and Allen R. Syrinek, both of Richmond, all of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Sep. 9, 1983, Ser. No. 530,569
Int. Cl.³ C09K *7/02*
U.S. Cl. 252—8.5 C **2 Claims**

1. A method of improving high temperature fluid loss and rheology stabilization of high calcium brine clay-containing oil well drilling fluids which comprises adding thereto a stabilizing amount of a water-soluble terpolymer comprising:

Ingredients	Mole %
2-acrylamido-2-methylpropane-sulfonic acid, sodium salt	51–59
N,N—dimethylacrylamide	6–28
acrylonitrile	20–35

and said terpolymer being further characterized as having a molecular weight below 1,000,000.

4,502,965

TERPOLYMERS FOR USE AS HIGH TEMPERATURE FLUID LOSS ADDITIVE AND RHEOLOGY STABILIZER FOR HIGH PRESSURE, HIGH TEMPERATURE OIL WELL DRILLING FLUIDS

David M. Giddings, Sugar Land; Donald G. Ries, and Allen R. Syrinek, both of Richmond, all of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Sep. 9, 1983, Ser. No. 530,796
Int. Cl.³ C09K *7/02*
U.S. Cl. 252—8.5 C **2 Claims**

1. A method of improving high temperature fluid loss and rheology stabilization of high calcium brine clay-containing oil well drilling fluids which comprises adding thereto a stabilizing amount of a water-soluble terpolymer comprising:

Ingredients	Mole %
2-acrylamido-2-methylpropane-sulfonic acid, sodium salt	58–77
N—vinylpyrrolidone	2–20
acrylonitrile	4–36

and said terpolymer being further characterized as having a molecular weight below 1,000,000.

4,502,966

TERPOLYMERS FOR USE AS HIGH TEMPERATURE FLUID LOSS ADDITIVE AND RHEOLOGY STABILIZER FOR HIGH PRESSURE, HIGH TEMPERATURE OIL WELL DRILLING FLUIDS

David M. Giddings, Sugar Land; Donald G. Ries, and Allen R. Syrinek, both of Richmond, all of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Sep. 9, 1983, Ser. No. 530,814

Int. Cl.³ C09K *7/02*

U.S. Cl. 252—8.5 C **2 Claims**

1. A method of improving high temperature fluid loss and rheology stabilization of high calcium brine clay-containing oil well drilling fluids which comprises adding thereto a stabilizing amount of a water-soluble terpolymer comprising:

Ingredients	Mole %
2-acrylamido-2-methylpropane-sulfonic acid, sodium salt	57–61
acrylamide	20–35
N,N—diallylacetamide	4–23

and said terpolymer being further characterized as having a molecular weight below 1,000,000.

4,502,967

METHOD AND COMPOSITIONS FOR FRACTURING SUBTERRANEAN FORMATIONS

Michael W. Conway, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 423,573, Sep. 27, 1982, Pat. No. 4,462,917. This application May 8, 1984, Ser. No. 608,063

The portion of the term of this patent subsequent to Jul. 31, 2001, has been disclaimed.

Int. Cl.³ E21B *43/26*

U.S. Cl. 252—8.55 R **20 Claims**

1. An aqueous gel comprising:

an aqueous fluid comprising a water-alcohol solution having from about 0 to 80 percent alcohol by volume;

a gelling agent comprising a solvatable polysaccharide having a molecular weight in excess of about 100,000 present in an amount sufficient to gel said aqueous fluid; and

a retarded crosslinking composition, present in an amount sufficient to crosslink at least a portion of said gelling agent, comprising an organotitanate chelate which is soluble in said aqueous fluid, a polyhydroxyl-containing compound comprising at least one member selected from the group consisting of glycerol, erythritol, threitol, ribitol, arabinitol, xylitol, allitol, altritol, sorbitol, mannitol, dulcitol, iditol, and perseitol and an aqueous fluid, said retarded crosslinking composition having been aged for a period of at least about one hour prior to admixing with said solvatable polysaccharide and said constituents of said retarded crosslinking composition being present in a volumetric ratio, respectively, in the range of from about 1:0.05:0.05 to about 1:10:10.

4,502,968

LUBRICATING AGENTS FOR PROCESSING FIBERS AND METHOD OF PROCESSING THERMOPLASTIC SYNTHETIC FIBER FILAMENTS THEREWITH

Ippei Noda, and Osamu Ogiso, both of Aichi, Japan, assignors to Takemoto Yushi Kabushiki Kaisha, Aichi, Japan

Filed Dec. 22, 1983, Ser. No. 564,168

Claims priority, application Japan, Mar. 30, 1983, 58-55475

Int. Cl.³ D06M *13/18, 13/40, 13/38*

U.S. Cl. 252—8.8 **4 Claims**

1. A lubricating agent for processing fibers comprising at least one kind of silyl polyether obtainable as a reaction product between polyether which is derived by ring-opening addition polymerization of cyclic ether monomers with 2 to 4 carbon atoms and the molecule of which contains at least one hydroxyl group and halogenated substituted silane shown by formula

(I)

(II)

where R_1–R_5 may be alike or different, each representing hydrogen, alkyl group, cycloalkyl group, allyl group, phenyl group, alkylphenyl group or benzyl group, R_1–R_3 are not all hydrogen, R_4 and R_5 are not both hydrogen and X, Y_1 and Y_2 represent individually chlorine, bromine or iodine.

4,502,969

WORKOVER AND COMPLETION FLUIDS

Francis J. Shell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 12, 1982, Ser. No. 367,824

Int. Cl.³ E21B *43/00*

U.S. Cl. 252—8.55 R **24 Claims**

1. A method for reducing the loss of fluid into a formation from a water base workover or completion fluid which is substantially free of clay and has a pH of less than 10 during workover or completion operations in a cased borehole, which method comprises incorporating into the workover or completion fluid an effective amount of a mixed polysaccharide selected from the group consisting of malto-dextrins, fructo-dextrins and lacto-dextrins such that said fluids ability to suspend weighting agents is improved and a suitable viscosity is maintained.

4,502,970

LUBRICATING OIL COMPOSITION

Alan A. Schetelich, Scotch Plains; Norman Tunkel, Perth Amboy, and Darrell W. Brownawell, Scotch Plains, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 386,293, Jun. 8, 1982, abandoned. This application May 12, 1983, Ser. No. 493,942

Int. Cl.³ C10M *1/48*

U.S. Cl. 252—32.7 E **9 Claims**

1. Crankcase lubricating oil composition effective in both gasoline and diesel internal combustion engines comprising a major amount of an oil of lubricating viscosity containing 0–15 wt. % of a viscosity index improver and

(a) at least about 0.5 wt. % of a lubricating oil dispersant;

(b) about 2 to 12 wt. % of an overbased metal detergent additive or mixtures thereof with neutral metal detergent additive, said metal detergent additive being selected from the group consisting of oil soluble calcium, magnesium and barium sulfonates, phenates, and sulfurized phenates;

(c) a zinc dialkyl dithiophosphate anti-wear additive; and

(d) a polyisobutenyl succinic anhydride having and $\overline{Mn}$ (number average) molecular weight of about 900 to 2000;

wherein the weight ratio of said dispersant to said polyisobutenyl succinic anhydride is less than 1.75 when the amount of dispersant in the composition is about 3.5 wt. % or less and said weight ratio being less than about 7 when the amount of dispersant present is greater than 3.5 wt. % up to about 10 wt. %.

4,502,971

CONCENTRATES OF LUBRICANT ADDITIVES

Robert Robson, Oxford, England, assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Mar. 14, 1983, Ser. No. 475,304

Claims priority, application United Kingdom, Mar. 24, 1982, 8208697

Int. Cl.³ C10M *1/32, 1/54*

U.S. Cl. 252—33.3 13 Claims

1. A process for improving the compatibility of an oil soluble nitrogen or ester-containing lubricating oil ashless dispersant with basic oil-soluble magnesium compounds useful as lubricating oil detergent additives comprising pre-reacting the dispersant with a basic salt of an alkali metal prior to mixing the dispersant with the magnesium compound, in which the amount of the alkali metal salt corresponds to from 0.01 to 0.075 gram atoms of alkali metal per 100 g of dispersant.

4,502,972

LUBRICATING OIL COMPOSITION CONTAINING A DIALKYL DITHIOCARBAMATE-MODIFIED EPDM VISCOSITY INDEX IMPROVER

Bryan T. Davis, Baton Rouge, La., and Jackson C. Chen, Brea, Calif., assignors to Ethyl Corporation, Richmond, Va.

Filed Jun. 25, 1982, Ser. No. 392,288

Int. Cl.³ C10M *1/38*

U.S. Cl. 252—47 6 Claims

1. A viscosity index improving additive having wear inhibiting properties, said additive comprising a polymeric backbone containing ethylene, propylene and non-conjugated diene units to which is bonded a di-C_{1-20} alkyl dithiocarbamate group, said additive being made by the process of reacting a halogen with a copolymer of ethylene, propylene and a non-conjugated diene to form a halogen-substituted copolymer, said copolymer having an average molecular weight of about 20,000 to 300,000 and then reacting said halogen-substituted copolymer with an alkali metal di-C_{1-20} alkyl dithiocarbamate.

5. A lubricating oil composition containing an amount of an additive of claim 1 which will increase the viscosity index of said oil and improve the wear inhibiting properties of said oil.

4,502,973

ELECTROVISCOUS FLUIDS

James E. Stangroom, Castleton, England, assignor to National Research Development Corporation, London, England

PCT No. PCT/GB82/00183, § 371 Date Feb. 3, 1983, § 102(e) Date Feb. 3, 1983, PCT Pub. No. WO82/04442, PCT Pub. Date Dec. 23, 1982

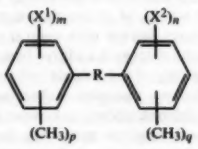
PCT Filed Jun. 18, 1982, Ser. No. 466,337

Claims priority, application United Kingdom, Jun. 19, 1981, 8118885

Int. Cl.³ H01B *3/24;* C09K *3/00*

U.S. Cl. 252—73 14 Claims

1. An electroviscous liquid comprising a hydrophilic solid and a hydrophobic liquid component wherein the hydrophobic liquid component comprises at least one diaryl derivative of general formula I



I

wherein R is CY_2, O, S, SO, SO_2, SiO_2, SiF_2 or O-SiY_2-O, X^1 and X^2 are either the same or different and are F, Cl or Br, each of m and n is 0, 1, 2 or 3, each of p and q is 0, 1 or 2 and Y is H, F or a methyl or ethyl group, provided that, for the said diaryl derivatives in the liquid component, the average value of (m+n) is from 1 to 3 inclusive and the average value of (p+q) is from 0 to 1 inclusive.

4,502,974

HIGH TEMPERATURE LIQUID-CRYSTALLINE ESTER COMPOUNDS

Shigeru Sugimori, and Tetsuhiko Kojima, both of Kanagawaken, Japan, assignors to Chisso Corporation, Osaka, Japan

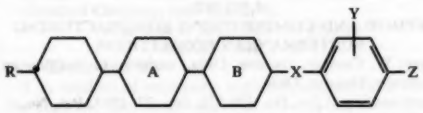
Filed Mar. 23, 1983, Ser. No. 477,973

Claims priority, application Japan, Mar. 31, 1982, 57-53366; May 20, 1982, 57-85269; May 20, 1982, 57-85271; May 31, 1982, 57-92772; Jun. 17, 1982, 57-104365; June 23, 1982, 57-107724; Jul. 6, 1982, 57-117409; Jul. 21, 1982, 57-127291; Jul. 21, 1982, 57-127295; Aug. 2, 1982, 57-134964; Aug. 5, 1982, 57-136658; Aug. 11, 1982, 57-139451; Aug. 11, 1982, 57-139452; Aug. 24, 1982, 57-146594; Aug. 24, 1982, 57-146595; Aug. 30, 1982, 57-150424; Sep. 3, 1982, 57-153601; Oct. 5, 1982, 57-175145; Oct. 26, 1982, 57-188047; Nov. 4, 1982, 57-193637; Jan. 12, 1983, 58-3254; Jan. 27, 1983, 58-11906; Aug. 11, 1983, 57-139452

Int. Cl.³ C09K *3/34;* C07C *69/773, 69/753, 121/52, 120/04, 69/76*

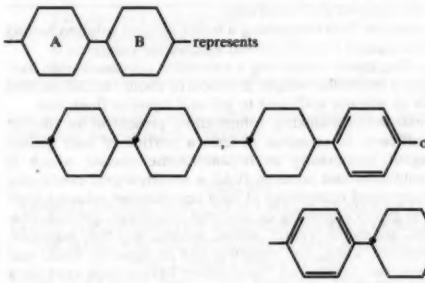
U.S. Cl. 252—299.63 16 Claims

1. Liquid crystalline ester compounds expressed by the general formula

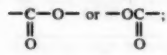


(I)

wherein R represents hydrogen atom or an alkyl group of 1 to 10 carbon atoms;

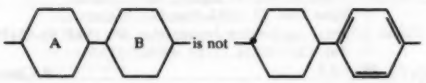


X represents



Y is hydrogen, F or Cl; and

Z is F, Cl or CN; with the proviso that when Y is hydrogen then



4,502,975
COMPOSITIONS FOR RECOVERING AN ORGANIC MATERIAL FROM AN OILY LAYER ON A BODY OF WATER

Toshiaki Kobayashi, Tsuzuki; Yuji Kawashima, Otsu; Masafumi Yoshimura, Kuse; Masaru Sugiura; Tomio Nobe, both of Yahata, and Sumio Fujimoto, Takatsuki, all of Japan, assignors to New Japan Chemical Co., Ltd., Kyoto, Japan

Filed Sep. 29, 1982, Ser. No. 427,141

Claims priority, application Japan, May 26, 1981, 56-80537; Dec. 9, 1981, 56-198801; Mar. 12, 1982, 57-39722

Int. Cl.³ B01J *13/00*; C02F *1/68*

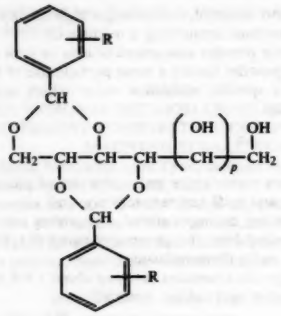
U.S. Cl. 252—315.1 **14 Claims**

1. An organic material gelling and recovering composition for recovering a liquid organic material on a body of water comprising:

I. about 1 to about 30 wt.% of at least one member select from the group consisting of:

(a) a compound represented by the formula

(I)



wherein R is hydrogen atom, halogen atom, lower alkyl, lower alkoxy or nitro, and p is 0 or 1,

(b) hydrogenated castor oil,

(c) 12-hydroxystearic acid,

(d) 9,10-dihydroxystearic acid, and

(e) an amide of the member (b), (c) or (d),

the composition further comprising at least one of

II. about 15 to about 70 wt.% of a hydrophilic solvent serving as a good solvent for the component I, and selected from the group consisting of N,N-dimethylformamide, N,N-dimethylacetamide, dimethylsulfoxide, ethylene carbonate, sulfolane, ethylene glycol methyl ether, ethylene glycol ethyl ether, ethylene glycol propyl ether, ethylene glycol butyl ether, N-methyl-2-pyrrolidone, N-ethyl-2-pyrrolidone, N-propyl-2-pyrrolidone, N,N-dimethylacrylamide, N-vinyl-2-pyrrolidone, N,N-dimethylaminopropylmethacrylamide, and N-isobutoxymethylacrylamide, and

III. about 15 to about 80 wt.% of at least one solvent selected from the group consisting of a hydrophobic solvent having a solubility of up to 5 g in 100 g of water, cyclohexanone, alkylcyclohexanone, N-cyclohexyl-2-pyrrolidone and N-C_4-C_{18} alkyl-2-pyrrolidone,

wherein components II and III are conjointly present when the component I is the compound of the formula (I).

4,502,976
WATER SOLUBLE POLYESTERS

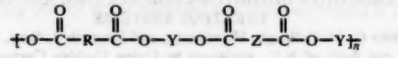
Jorge Heller, Woodside, Calif., assignor to Bend Research, Inc., Bend, Oreg.

Filed Oct. 25, 1982, Ser. No. 436,284

Int. Cl.³ B01J *13/00*

U.S. Cl. 252—315.4 **4 Claims**

1. Polyesters useful in the preparation of bioerodible hydrogels having the general formula



in which R is an unsaturated lower aliphatic or cycloaliphatic group, Y is a water-soluble polyglycol group, Z is a dicarboxylic acid nucleus having an electron-withdrawing group placed vicinally to a carbonyl group of the acid, and n is an integer such that the molecular weight of the polyester is in the range about 5000 to about 30,000.

4,502,977
DEMULSIFIER COMPOSITION AND METHOD OF USE THEREOF

Rudolf S. Buriks, St. Louis, Mo., and James G. Dolan, Granite City, Ill., assignors to Petrolite Corporation, St. Louis, Mo.

Filed May 2, 1983, Ser. No. 490,742

Int. Cl.³ B01D *17/04*

U.S. Cl. 252—340 **30 Claims**

1. Composition comprising the reaction product of (a) a blend of at least two polyoxyalkylene oxide block copolymers, at least one of which is derived from a polyoxyalkylene glycol and a diglycidyl ether, and (b) a vinyl monomer, said reaction product being partially crosslinked.

30. Method of demulsifying a water-in-oil emulsion which comprises incorporating therein an effective demulsifying amount of a composition of claim 1.

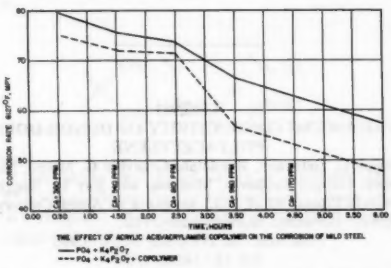
4,502,978
METHOD OF IMPROVING INHIBITOR EFFICIENCY IN HARD WATERS

John A. Romberger, Oak Park, and Daniel A. Meier, Naperville, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 8, 1982, Ser. No. 439,705

Int. Cl.³ C23F *11/18*

U.S. Cl. 252—389 A **4 Claims**



1. A method of enhancing the corrosion inhibiting effect of phosphate and polyphosphate inorganic corrosion inhibitors when used in high hardness waters containing at least 800 parts per million total hardness in contact with mild steel and admiralty metals which comprises adding to the high hardness waters containing said inorganic corrosion inhibitors from 1–150 ppm of a water-soluble acrylic acid:acrylamide copolymer having a monomer weight ratio of 1:4 to 1:2 of acrylic acid:acrylamide and having a molecular weight between 1,000–25,000.

4,502,979

CORROSION INHIBITORS FOR ALKANOLAMINE GAS TREATING SYSTEMS

John G. McCullough, Hawthorne, and Kenneth J. Barr, Yonkers, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 163,975, Jun. 30, 1980, abandoned.
This application Nov. 29, 1982, Ser. No. 444,980
Int. Cl.³ C23F 11/18; C09K 3/00
U.S. Cl. 252—389 R 37 Claims

1. A corrosion inhibitor, in acid gas removal service, suitable for inhibiting corrosive aqueous alkanolamine solutions in contact with a metallic surface comprising an inhibiting amount of the synergistic combination of at least one vanadium compound wherein the vanadium therein is in the plus five valence state in the aqueous alkanolamine solution and an organic compound selected from the group consisting of nitro-substituted aromatic acids, nitrosubstituted aromatic acid salts, and mixtures thereof; wherein at least a portion of the acid gas is hydrogen sulfide.

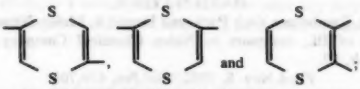
4,502,980

DITHIENE ELECTROACTIVE POLYMERS

Peter Denisevich, Jr., El Cerrito; Shigeto Suzuki, San Francisco; Victor P. Kurkov, San Rafael, and Albert H. Schroeder, Richmond, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Nov. 17, 1982, Ser. No. 442,396
Int. Cl.³ H01B 1/00, 1/02, 1/06
U.S. Cl. 252—500 17 Claims

1. A tractable electroactive polymer which comprises a charged polymer backbone of recurring units of a 1,4-dithiene diradical selected from the group consisting of:



and a sufficient concentration of a charge-compensating ionic dopant associated therewith, wherein the polymer backbone is capable of undergoing reversible oxidation or reversible reduction or both to form the charged polymer backbone.

4,502,981

ENHANCING CONDUCTIVITY OF DONOR-DOPED POLYACETYLENE

Philippe G. Delannoy, Randolph; Granville G. Miller, Morristown; Helmut Eckhardt, Madison, and Ray H. Baughman, Morris Plains, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Mar. 16, 1983, Ser. No. 475,996
Int. Cl.³ H01B 1/06
U.S. Cl. 252—512 18 Claims

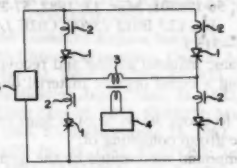
1. A process for the preparation of donor-doped polyacetylene of increased conductivity which comprises heating and maintaining a potassium-doped or rubidium-doped polyacetylene at at least one elevated temperature between about 60° C. and about 400° C. and cooling back to a temperature below about 50° C., with the time at elevated temperature being sufficiently long to increase the conductivity of the potassium-doped or rubidium-doped polyacetylene (measured by the four-probe method at room temperature) to at least 150% of its conductivity prior to heating to elevated temperature.

4,502,982

IRON CORE MATERIAL

Hiromichi Horie, Yokosuka; Kazumi Shimotori, Kawasaki, and Hideki Murabayashi, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Feb. 24, 1983, Ser. No. 469,270
Claims priority, application Japan, Feb. 26, 1982, 57-28928
Int. Cl.³ H01B 1/02
U.S. Cl. 252—513 6 Claims



1. An iron core material, comprising a high density compression molded product comprising a mixture of

(a) a magnetic powder comprised of iron or iron alloy said magnetic powder having a mean particle size of 100 μm or less and a specific resistance value which satisfies the relationship

$$\rho/D^2 \geq 4\times10^{-3}$$

where the mean particle size and resistivity of said magnetic powder is Dμ and ρμΩ-cm, respectively, and

(b) an insulating caking material comprising one or more resins selected from the group consisting of a thermosetting resin and a thermoplastic resin,

such that said product contains between about 1.5% and about 25% by volume of said caking material.

4,502,983

COMPOSITE SILICON CARBIDE SINTERED SHAPES AND ITS MANUFACTURE

Mamoru Omori, 18-1, 2-chome, Kano, Sendai-shi, Miyagi-ken, and Humihiko Takei, Sendai, both of Japan, assignors to Mamoru Omori, Miyagi, Japan

Filed Jun. 28, 1983, Ser. No. 508,809
Int. Cl.³ C04B 35/56
U.S. Cl. 252—516 4 Claims

1. A composite silicon carbide sintered shape consisting of 11.300–65.000 atomic percent of one or more members selected from the group of rare earth oxides and balance substantially being of SiC, said shape having a surface layer abundant in rare earth oxide.

4,502,984

ELECTROCONDUCTIVE BASE SHEET FOR ELECTROSTATIC RECORDING

Eiichi Kato; Masataka Okamoto; Hiroshi Ueda, and Masaharu Inaba, all of Tokyo, Japan, assignors to Jujo Paper Co., Ltd., Tokyo, Japan

Filed Oct. 13, 1983, Ser. No. 541,568
Claims priority, application Japan, Oct. 14, 1982, 57-179154; Nov. 4, 1982, 57-192382
Int. Cl.³ H01B 1/06
U.S. Cl. 252—518 9 Claims

1. Electroconductive base sheet for electrostatic recording, which comprises an electroconductive layer containing both a metal oxide semiconductor and at least one substance selected from the group consisting of maltose, lactose, melibiose, xylose, galactose, arabinose, mannose, fructose, sorbose, 2-keto-gluconic acid, glucuronic acid, erythrobic acid, 5-0-methylascorbic acid, ascorbic acid-6-phosphate, ascorbic acid-5-sulfate, 6-0-acetyl ascorbic acid, scorbamic acid and sodium ascorbate, said metal oxide semiconductor being at least one member

selected from the group consisting of zinc oxide, tin oxide, cadmium oxide, titanium oxide, aluminum oxide, indium oxide and thorium dioxide.

4,502,985

USE OF 1,5-DIMETHYL-8-HYDROXIMINO-BICYCLO[3.2.1]OCTANE AS PERFUMING INGREDIENT

Ernst-Joachim Brunke, Holzminden, Fed. Rep. of Germany, assignor to Dragoco Gerberding & Co. GmbH, Holzminden, Fed. Rep. of Germany

Filed Jul. 21, 1982, Ser. No. 400,261
Int. Cl.³ A61K 7/46; C11B 9/00
U.S. Cl. 252—522 R **4 Claims**

1. Process for imparting, enhancing or modifying the odorous note of a material selected from the group consisting of perfumes and perfume compositions by imparting a blackcurrant note, which comprises adding thereto a 1,5-dimethyl-8-hydroximinobicyclo3,2,1octane, at a concentration of at least 1 part per million by weight based on the total weight of the thus obtained material.

4,502,986

STAIN REMOVAL METHOD USING GRANULAR DETERGENT COMPOSITION COMPRISING MAGNESIUM SALT

Peter Robson, Newcastle upon Tyne, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 517,479, Jul. 26, 1983, abandoned, which is a continuation of Ser. No. 260,247, May 5, 1981, abandoned. This application Jul. 13, 1984, Ser. No. 630,996
Claims priority, application United Kingdom, May 10, 1980, 8015542
Int. Cl.³ C11D 1/18, 3/26, 7/32
U.S. Cl. 252—526 **5 Claims**

1. A method of washing fabric stained with tea or wine stains to remove such stains while maintaining the whiteness of white fabrics in the wash load, said method comprising washing such fabric in a washing machine with an aqueous wash solution of a composition comprising:

(a) from 5% to 30% of surfactant selected from the group consisting of anionic and ethoxylated nonionic surfactants and mixtures thereof,

(b) from 5% to 90% of inorganic or organic detergency builder,

(c) from 0.015% to 0.12%, based on the weight of magnesium, of water soluble magnesium salt, and

(d) from 0.05% to 0.4%, based on the weight of aminopolyphosphonic acid, of ethylenediamine tetra(methylenephosphonic acid), diethylenetriamine penta(methylenephosphonic acid), or water soluble salts thereof.

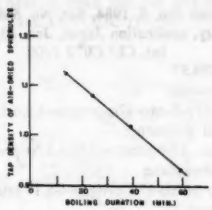
4,502,987

METHOD OF CONTROLLING CRYSTALLITE SIZE IN NUCLEAR-REACTOR FUELS

Milton H. Lloyd, Oak Ridge; Jack L. Collins, Knoxville, and Sam E. Shell, Oak Ridge, all of Tenn., assignors to The United State of America as represented by The United States Department of Energy, Washington, D.C.

Filed Sep. 28, 1982, Ser. No. 426,365
Int. Cl.³ G21C 21/02
U.S. Cl. 252—635 **5 Claims**

1. An improved method for preparing internally gelated nuclear reactor fuel spherules via a sol-gel process wherein a concentrated hexamethylene-tetramine-urea solution is employed with a solution of metals selected from the group consisting of uranium, plutonium, thorium, and mixtures thereof in spherule-forming operations, the improvement comprising the step of heat-treating the HMTA-urea solution for a sufficient duration without causing excessive urea decomposition for effecting control of the crystallite size of phases present in the



resulting spherules prior to the addition of the solution of metals and conducting of said spherule-forming operations.

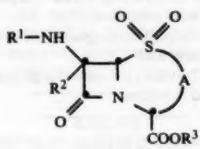
4,502,988

OXIDATION PROCESS

Lowell D. Hatfield, Bargersville, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Aug. 8, 1983, Ser. No. 521,197
Int. Cl.³ C07D 499/04
U.S. Cl. 260—239.1 **17 Claims**

1. A process for preparing a penicillin or cephalosporin sulfone of the formula



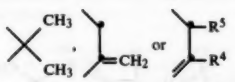
wherein:

R^1 is hydrogen or a carboxylic acid acyl residue;

R^2 is hydrogen or lower alkoxy;

R^3 is hydrogen, a carboxy protecting group or a salt forming group;

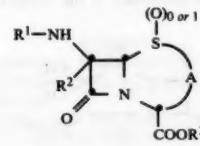
A is



in which:

R^4 is halo, lower alkyl, lower alkoxy, or $—CH_2R^6$, wherein R^6 is lower alkanoyloxy or a heterocyclic group; and

R^5 is hydrogen or alkoxycarbonyloxy; comprising reacting a compound of the formula



with about 1 to about 10 molar excess of an oxidizing agent and a catalytic amount of ruthenium tetroxide in a suitable solvent at a temperature of about −20° C. to about 50° C.

4,502,989

ALDOSTERONE-ANTAGONISTIC STEROIDS

Susumu Kamata, Hyogo; Takeaki Matsui, and Nobuhiro Haga, both of Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Jan. 5, 1984, Ser. No. 568,878
Claims priority, application Japan, Jan. 31, 1983, 58-14980
Int. Cl.³ C07J *1/00*
U.S. Cl. 260—239.57 15 Claims

1. The compounds:

a. 17-hydroxy-3-oxo-17α-pregna-1,4,6,11-tetraene-21-carboxylic acid γ-lactone;

b. potassium 17-hydroxy-3-oxo-17α-pregna-1,4,6,11-tetraene-21-carboxylate;

c. 17-hydroxy-3-oxo-17α-pregna-4,6,11-triene-21-carboxylic acid γ-lactone;

d. potassium 17-hydroxy-3-oxo-17α-pregna-4,6,11-triene-21-carboxylate;

e. 17-hydroxy-6α,7α-methylene-3-oxo-17α-pregna-4,11-diene-21-carboxylic acid γ-lactone;

f. potassium 17-hydroxy-6α,7α-methylene-3-oxo-17α-pregna-4,11-diene-21-carboxylate;

g. 17-hydroxy-6α,7α-methylene-3-oxo-17α-pregna-1,4,11-triene-21-carboxylic acid γ-lactone;

h. 17-hydroxy-3-oxo-7α-trimethylacetylthio-17α-pregna-4,11-diene-21-carboxylic acid γ-lactone;

i. 17-hydroxy-3-oxo-17α-pregna-4,11-diene-21-carboxylic acid γ-lactone;

j. potassium 17-hydroxy-3-oxo-17α-pregna-4,11-diene-21-carboxylate;

k. 7α-acetylthio-17-hydroxy-3-oxo-17α-pregna-4,11-diene-21-carboxylic acid γ-lactone;

l. 7α-benzoylthio-17-hydroxy-3-oxo-17α-pregna-4,11-diene-21-carboxylic acid γ-lactone;

m. 17-hydroxy-3-oxo-17α-pregna-1,4,11-triene-21-carboxylic acid γ-lactone, and

n. 6β-chloro-17-hydroxy-3-oxo-17α-pregna-4,11-diene-21-carboxylic acid γ-lactone.

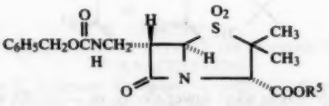
4,502,990

PROCESS FOR 6-(AMINOMETHYL)PENICILLANIC ACID 1,1-DIOXIDE AND DERIVATIVES THEREOF

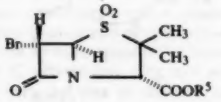
Wayne E. Barth, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jun. 6, 1983, Ser. No. 501,476
Int. Cl.³ C07D *499/00*; A61K *31/425*
U.S. Cl. 260—245.2 R 20 Claims

1. A process for the preparation of a compound of the formula



wherein R^5 is a conventional carboxy protecting group removable by hydrogenolysis, or a conventional ester forming radical which is hydrolyzable under physiological conditions, which comprises reacting a compound of the formula



with substantially 2 molar equivalents of methylmagnesium bromide and then 1 molar equivalent of benzyl N-(acetoxymethyl)carbamate at −50° to −100° C. in an ethereal solvent.

4,502,991

23,23-DIFLUORO-1α,25-DIHYDROXY-VITAMIN D_3

Hector F. DeLuca; Yoko Tanaka, both of Madison, Wis.; Nobuo Ikekawa, and Yoshiro Kobayashi, both of Tokyo, Japan, assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Aug. 18, 1983, Ser. No. 524,268
Int. Cl.³ C07J *9/00*
U.S. Cl. 260—397.2 3 Claims

1. 23,23-difluoro-1,25-dihydroxy-vitamin D_3.

4,502,992

PROCESS FOR THE CONTINUOUS PRODUCTION OF ALKYLESTERS OF SATURATED ALIPHATIC CARBOXYLIC ACIDS

Peter Hofmanns; Hans Regner; Manfred Köppner, and Michael Zölffel, all of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Hüls AG, Marl, Fed. Rep. of Germany

Filed May 10, 1982, Ser. No. 376,750
Claims priority, application Fed. Rep. of Germany, May 16, 1981, 3119594
Int. Cl.³ C11C *3/02*
U.S. Cl. 260—410.9 R 14 Claims

1. In a process for the continuous production of alkylesters of saturated aliphatic carboxylic acids by reacting starting materials comprising olefins with carbon monoxide and alkanol in the presence of a catalyst consisting of a cobalt compound and a promoter selected from the group consisting of pyridine, non-ortho-substitued alkylpyridines and mixtures thereof at elevated carbon monoxide pressures and elevated temperatures in a reactor having an input side, the improvement comprising:

said olefins having at least 8 carbon atoms and carrying out the reaction in said reactor comprising a single, cylindrical vertical tube and having tubular flow without back-mixing, and feeding said raw materials in given reaction ratios into said input side of said reactor.

4,502,993

PROCESS FOR THE PREPARATION OF UNSATURATED ALIPHATIC CARBOXYLIC ACIDS

Hermann Neu, Neu-Isenburg, and Günter Roscher, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 19, 1982, Ser. No. 379,781
Claims priority, application Fed. Rep. of Germany, May 21, 1981, 3120244
Int. Cl.³ C11C *1/04*; C07C *51/00*
U.S. Cl. 260—415 8 Claims

1. A process for the preparation of of an unsaturated aliphatic carboxylic acid, comprising the following steps in the order named:

(a) reacting a carbonyl compound with a ketene to form a condensation reaction mixture containing a polyester;

(b) admixing water with the condensation reaction mixture;

(c) heating the admixture to a temperature of from 40° C. below the boiling point to the boiling point of the admixture;

(d) isolating the polyester; and

(e) thermally cracking the polyester to form the unsaturated aliphatic carboxylic acid.

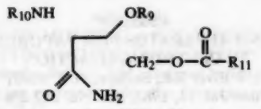
4,502,994

ENANTIOMERIC SYNTHESIS OF 3-AMINO-4-CARBAMOYLOXYMETHYL-2-AZETIDONONE-1-SULFATE

Chung-Chen Wei, Cedar Knolls, and Manfred Weigele, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 9, 1982, Ser. No. 448,116
Int. Cl.[3] C07C *143/68, 125/06*
U.S. Cl. 260—456 A 7 Claims

1. The compound of the formula



wherein R_{10} is a conventional amino protecting group; R_9 is hydrogen or taken together with its attached oxygen forms a sulfonyl leaving group; R_{11} is hydrogen, lower alkyl, aryl, or halo lower alkyl.

4,502,995

NUCLEOPHILIC SUBSTITUTION PROCESS

Barbara C. Stahly, and G. Patrick Stahly, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 317,321, Nov. 2, 1981, Pat. No. 4,370,278. This application Dec. 23, 1982, Ser. No. 452,518
The portion of the term of this patent subsequent to Jan. 25, 2000, has been disclaimed.
Int. Cl.[3] C07C *121/50, 63/33*
U.S. Cl. 260—465 G 11 Claims

1. A process which comprises reacting an o-fluoronitrobenzene bearing at least one innocuous ar-substituent and having an unsubstituted position para to the nitro group with an alpha-haloacetonitrile corresponding to the formula:

wherein L is halo and R is an alkyl group containing 1–10 carbons in an inert dipolar aprotic solvent and in the presence of a strong alkali metal compound base so that the nitrile undergoes a nucleophilic substitution on an unsubstituted ring carbon of the fluoronitrobenzene during which the alpha-halo substituent functions as a leaving group, thereby forming a fluoronitroarylacetonitrile.

4,502,996

NUCLEOPHILIC SUBSTITUTION PROCESS

G. Patrick Stahly, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 418,915, Sep. 16, 1982, abandoned, which is a continuation-in-part of Ser. No. 317,322, Nov. 2, 1981, abandoned. This application Dec. 23, 1982, Ser. No. 452,615
Int. Cl.[3] C07C *121/50*
U.S. Cl. 260—465 G 12 Claims

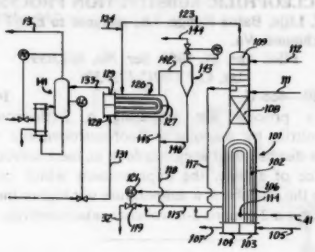
1. A process which comprises (A) reacting 2-chloronitrobenzene with an alpha-chloro- or alpha-bromopropionitrile in an inert dipolar aprotic solvent and in the presence of a strong alkali metal compound base so that the nitrile undergoes a nucleophilic substitution on an unsubstituted ring carbon of the chloronitrobenzene during which the alpha-chloro or alpha-bromo substituent functions as a leaving group, thereby forming 2-(2-chloronitrobenzene)propionitrile, and (B) selectively reducing the 2-(2-chloronitrobenzene)propionitrile to 2-(4-amino-3-chlorobenzene)propionitrile.

4,502,997

TREATMENT OF PURGE GAS

Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Mar. 4, 1983, Ser. No. 472,187
Int. Cl.[3] C07C *121/50*
U.S. Cl. 260—465 C 16 Claims



1. A process for treating a purge gas containing carbon dioxide, water vapor, condensable organic and ammonia, comprising:

scrubbing the purge gas with water, said scrubbing absorbing ammonia from the purge gas; recovering a scrubbed purge gas; adding water to the scrubbed purge gas in an amount in excess of the amount required to dissolve the maximum amount of ammonium bicarbonate which can be formed from any ammonia and carbon dioxide present in the purge gas to prevent salting out of ammonium bicarbonate; and cooling the scrubbed purge gas to a temperature from 0° C. to 20° C. to condense the condensable organic and water therefrom and provide a purge gas suitable for venting.

4,502,998

NUCLEOPHILIC SUBSTITUTION PROCESS

Barbara C. Stahly, and G. Patrick Stahly, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 452,618, Dec. 23, 1982, , which is a continuation-in-part of Ser. No. 411,554, Aug. 25, 1982, abandoned. This application Mar. 10, 1983, Ser. No. 474,138
Int. Cl.[3] C07C *121/50*
U.S. Cl. 260—465 R 9 Claims

1. A process which comprises reacting a nitrophenoxy- or nitrophenylthiobenzene with an alpha-haloacetonitrile corresponding to the formula:

wherein L is halo and R is an alkyl group containing 1–10 carbons in an inert dipolar aprotic solvent and in the presence of a strong alkali metal compound base so as to form a nitrophenoxy- or nitrophenylthiobenzeneacetonitrile.

4,502,999

NUCLEOPHILIC SUBSTITUTION PROCESS

Kenneth C. Lilje, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Apr. 21, 1983, Ser. No. 487,038
Int. Cl.[3] C07C *121/50*
U.S. Cl. 260—465 G 9 Claims

1. In a process for preparing a 2-(fluoronitrobenzene)acetonitrile by reacting a fluoronitrobenzene with an alpha,alpha-disubstituted acetonitrile in an inert solvent and in

the presence of a base, the improvement which comprises conducting the reaction in a solvent having a dipole moment not higher than about 2.0 debyes so as to form a 2-(fluoro-2-nitrobenzene)acetonitrile.

4,503,000

NUCLEOPHILIC SUBSTITUTION PROCESS

Kenneth C. Lilje, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Apr. 21, 1983, Ser. No. 487,039
Int. Cl.³ C07C *121/50*
U.S. Cl. 260—465 G **14 Claims**

1. In a process for preparing a 2-(fluoronitrobenzene)acetonitrile by reacting a fluoronitrobenzene with an alpha,alpha-disubstituted acetonitrile in an inert solvent and in the presence of a base, the improvement which comprises conducting the reaction at a temperature not higher than about 15° C. to form a 2-(fluoro-2-nitrobenzene)acetonitrile.

4,503,001

PROCESS FOR THE MANUFACTURE OF ACRYLONITRILE AND METHACRYLONITRILE

Robert K. Grasselli, Garfield Heights; Arthur F. Miller, Cleveland, and Harley F. Hardman, Lyndhurst, all of Ohio, assignors to Standard Oil Company (Indiana), Cleveland, Ohio

Continuation of Ser. No. 748,609, Dec. 7, 1976, abandoned, which is a continuation of Ser. No. 85,722, Oct. 30, 1970, abandoned. This application May 3, 1982, Ser. No. 373,904
Int. Cl.³ C07C *120/14*
U.S. Cl. 260—465.3 **44 Claims**

1. In a process for preparing acrylonitrile, methacrylonitrile or a mixture thereof by reacting propylene, isobutylene or a mixture thereof in the vapor phase with a molecular oxygen-containing gas and ammonia in the presence of an oxidation catalyst at a temperature of from about 500° to 1100° F. and at a pressure of about 0.5 to 5 atmospheres, the improvement wherein said oxidation catalyst has the formula:

$$A_aB_bC_cFe_dBi_eMo_fO_x$$

wherein

A is an alkali metal or mixture thereof;

B is at least one element selected from the group consisting of cobalt and nickel; and

C is at least one element selected from the group consisting of phosphorus and arsenic; and

wherein

a is a number greater than 0 to 3;

b is a number from 0.1 to 20;

c is a number from 0 to 3;

d is a number from 0.1 to 8;

e is a number from 0.1 to 6;

f is a number from 8 to 16; and

x is a number determined by the valence requirements of the other elements present.

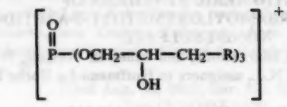
4,503,002

PHOSPHATE QUATERNARY COMPOUNDS

Raymond L. Mayhew, Summit, and Anthony J. O'Lenick, Fairlawn, both of N.J., assignors to Mona Industries, Inc., Paterson, N.J.

Continuation of Ser. No. 182,379, Aug. 29, 1980, abandoned, which is a division of Ser. No. 137,197, Apr. 4, 1980, Pat. No. 4,336,385, which is a continuation-in-part of Ser. No. 965,458, Nov. 30, 1978, Pat. No. 4,209,449. This application May 12, 1983, Ser. No. 492,550
Int. Cl.³ C07F *9/09*
U.S. Cl. 260—945 **11 Claims**

1. Phosphate-quaternary amine compound of the formula



wherein

R is a tertiary amine radical of from 6–40 carbon atoms; and

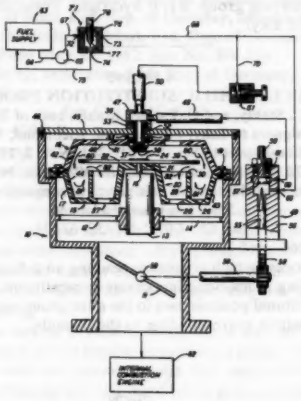
X is an anion.

4,503,003

METHOD AND APPARATUS FOR VAPORIZING FUEL BY CENTRIFUGAL ACTION

Jack J. Gilbert, 3 River Rd., Suffern, N.Y. 10901

Filed Jul. 11, 1983, Ser. No. 512,278
Int. Cl.³ F02M *17/16*
U.S. Cl. 261—51 **14 Claims**



1. A method for providing a gaseous mixture of fuel and air to a combustion apparatus, the method comprising:

delivering a flow of volatile liquid fuel to a fuel chamber located inside an intake passage of a combustion apparatus, the fuel chamber having an axis of symmetry coincident with the axis of the intake passageway and an upstream-facing fuel distribution surface extending transversely outward to a circumferential edge spaced radially inward from a peripheral outer wall of the chamber, and the fuel being delivered through an axial fuel conduit to flow onto the fuel distribution surface,

rotating the fuel distribution surface and the peripheral outer wall of the fuel mixing chamber about said axis of symmetry at sufficient velocity to spread the liquid fuel in a thin film across said fuel distribution surface for promoting evaporation of the fuel and to maintain by centrifugal force any liquid fuel discharged from the circumferential edge of the surface in contact with the peripheral outer wall until the fuel evaporates; and

delivering a flow of air through the intake passage into the chamber through an inlet opening on the upstream side of the chamber and out of the chamber through an outlet opening on the downstream side of the chamber, the inlet and outlet openings being located closer to the axis of the chamber than the circumferential edge of the upstream-facing fuel distribution surface, and the peripheral outer wall extending from said inlet opening to said outlet opening, such that the flow of air passes over the fuel distribution surface, around the circumferential edge thereof, then inwardly toward the axis of the chamber and around an annular baffle connected to the downstream side of the

chamber adjacent to the outlet opening and extending in the upstream direction to terminate in an edge spaced axially from the downstream side of said transverse surface and radially inward from the surrounding outer wall for thorough mixing with evaporated fuel before leaving the chamber through said outlet opening and for assuring that no liquid fuel in entrapped in the fuel/air mixture discharged through the outlet opening of the rotating chamber, such that no liquid fuel is discharged through the outlet opening of the chamber.

4,503,004

METHOD OF MOLDING A RED PHOSPHOROUS PYROTECHNIC COMPOSITION

Peter D. Mirabella, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 12, 1984, Ser. No. 588,827
Int. Cl.³ C06B *45/10*
U.S. Cl. 264—3 R **8 Claims**

1. In an improved process of consolidating a pyrotechnic mix into a unitary tablet on a substantially less hazardous basis, said pyrotechnic mix consisting essentially of red phosphorous, sodium nitrate, and an epoxy binder, the improvement comprising adding silica to said pyrotechnic mix, automatically feeding said pyrotechnic mix to a mold, and automatically subjecting said molded pyrotechnic mix to a pressure of about 12,000 pounds per square inch for a dwell time of one second.

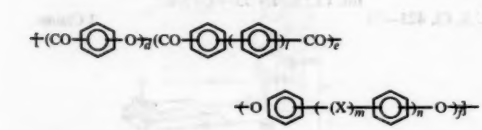
4,503,005

PROCESS FOR PRODUCING AN AROMATIC POLYESTER FIBER

Katsuji Ueno, Hirakata; Hiroaki Sugimoto, Takatsuki, and Kazuo Hayatsu, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 19, 1983, Ser. No. 486,486
Claims priority, application Japan, Apr. 28, 1982, 57-71840
Int. Cl.³ B29B *1/02, 3/00;* B29F *3/00*
U.S. Cl. 264—102 **16 Claims**

1. In a process for producing an aromatic polyester fiber of high strength and high modulus of elasticity represented by the general formula A:



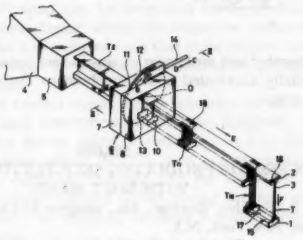
wherein X is an alkylene group of 1 to 4 carbon atoms, —O—, —S—, $-SO_2-$ or —CO—; l, m and n each are 0 or 1; d:e is in the range of 1:5 to 20:1; e:f is in the range of 9:10 to 10:9; and a carbonyl group and an oxy group, two carbonyl groups or two oxy groups are in a meta or para or corresponding position with each other, respectively, a process comprising grinding a polymer of the above general formula A to form ground particles having diameters of less than 3 mm and an average particle diameter of 0.5 mm or smaller; heat-treating the ground particles for 0.5 to 30 hr at a temperature between 100° and 350° C., at which temperature the particles do not fuse, to obtain particles having a melt property such that the temperature at which the particles possess a shear rate of 51/sec (48,000 poise as melt viscosity) under a shear stress of 2.45×10^6 dynes/cm^2 is in the range of 200° to 350° C.; melt-spinning the heat-treated particles at a temperature of 250° to 450° C., thereby forming a polymer fiber; and heat-treating the polymer fiber for 0.5 to 50 hr at a temperature between 250° and 450° C., at which temperature the fiber does not fuse.

4,503,006

METHOD AND APPARATUS FOR MANUFACTURING TAG PIN ASSEMBLIES

Masami Kato, Nagoya, Japan, assignor to Toska Co., Ltd., Tokyo, Japan; Ben Clements & Sons, Inc., South Hackensack, N.J. and Japan Bano'k Co., Ltd., Tokyo, Japan

Filed Jul. 28, 1982, Ser. No. 402,659
Int. Cl.³ B29D *5/00*
U.S. Cl. 264—148 **12 Claims**



1. A method of manufacturing tag pin assemblies, each said assembly having a plurality of individual tag pins, said individual tag pins comprising a head and a cross bar integrally connected by a filament, said individual tag pins being severably connected but abutting in their thickness direction, which method comprises the steps of continuously molding block tag-pin blanks of the sectional configuration corresponding to said individual tag pins by continuously extruding a synthetic resin from an extruder through a die, guiding each block tag-pin blank in the region of a cutter by means of guide member means having at least one guide hole of a shape conforming to that of the individual tag pins, and cutting the block tag-pin blank while the blank is in the region of the guide member means into slices having the prescribed thickness, while leaving an uncut portion in the cross bar, to thereby form a tag pin assembly.

9. Apparatus for manufacturing tag pin assemblies, each said assembly having a plurality of individual tag pins, said individual tag pins comprising a head and a crossbar integrally connected by a filament, said individual tag pins being severably connected but abutting in their thickness direction, which comprises an extruder provided with a die for continuously extruding block tag-pin blanks having a sectional configuration corresponding to the tag pin, and a cutter device for cutting said block tag-pin blanks into slices having the prescribed thickness and altogther connected with an uncut portion respectively thereof, said cutter device comprising integrally assembled block-blank guide member and tag-pin assembly guide member each formed with a guide hole therethrough shaped to conform to the configuration of the tag pin, said guide members defining a gap therebetween, and a cutter member rotatably mounted in said gap between said guide members.

4,503,007

POLYPROPYLENE STRAP AND METHOD OF MANUFACTURING THE SAME

Hiroyuki Matsumoto, Tokyo, Japan, assignor to Tsukasa Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

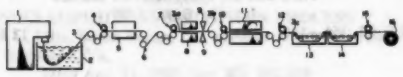
Division of Ser. No. 500,382, Jun. 2, 1983, Pat. No. 4,451,524.
This application Oct. 26, 1983, Ser. No. 545,687
Int. Cl.³ D01D *5/12*
U.S. Cl. 264—210.7 **1 Claim**

1. A method of manufacturing polypropylene straps, said method comprising the steps of:

(a) extruding a belt-like sheet of polypropylene material from a die;

(b) stretching the belt-like polypropylene material in the lengthwise direction thereof at a volume ratio of 4–9;

(c) heating the surfaces of the resulting belt-like material in a manner such as to put only the molecular chains in the outer layers thereof in a non-oriented state; and then
(d) stretching the belt-like material as a whole at a draw ratio of 1.2–3,



whereby said molecular chains in said outer layers are partially reoriented and contribute to the strength of said straps.

4,503,008

PROCESS FOR PRODUCING SELF-TEXTURING FABRIC WITH SOFT HAND

Billy L. Barkley, Decatur, Ala., assignor to Celanese Corporation, New York, N.Y.

Filed May 28, 1982, Ser. No. 383,038
Int. Cl.³ B29C *25/00*
U.S. Cl. 264—342 R **9 Claims**

1. A process for producing a fabric having a soft hand from a greige fabric comprising a yarn extending in a given direction along a given dimension of said fabric, said yarn having a shrinkage between about 5% and 25% and comprising a plurality of polyester continuous filaments having regions of high and low shrinkage along the lengths of said filaments, said regions of high and low shrinkage being out of phase from filament to filament, said filaments having average deniers less than 6 and within-filament shrinkage CV's of at least 10%, said process comprising:
a. shrinking said greige fabric to provide a shrunken fabric having a shrunken dimension in said direction; and
b. heat-setting said shrunken fabric at a temperature sufficiently high and for a time sufficiently long to cause said shrunken fabric to grow at least 3% in said direction as compared to said shrunken dimension.

4,503,009

PROCESS FOR MAKING COMPOSITE MECHANICAL PARTS BY SINTERING

Kazuo Asaka, Chiba, Japan, assignor to Hitachi Powdered Metals Co., Ltd., Chiba, Japan

Filed Apr. 28, 1983, Ser. No. 489,358
Claims priority, application Japan, May 8, 1982, 57-77154
Int. Cl.³ B22F *3/14*
U.S. Cl. 419—6 **1 Claim**

1. A process for making a mechanical part of a complicated profile which comprises: preparing a compact having a projection or shaft (hereinafter called the inner part) and a compact having a relative recess or opening (hereinafter called the outer part) by the compression of iron base metal powder; fitting the inner part into the outer part to form a fitted structure; and sintering the fitted structure to form the mechanical part, said process being characterized in that essentially the same base metal powder is used for both inner and outer parts, the iron base metal contains at least about 1.5 weight percent copper and the inner part contains carbon, as an essential component, in an amount that is larger than the carbon content of the outer part by at least 0.2% by weight.

4,503,010

PROCESS OF PRODUCING A COMPOUND MATERIAL OF CHROMIUM AND COPPER

Horst Kippenberg, Herzogenaurach; Heinrich Haessler, Wendelstein, and Manfred Huehnlein, Nuremberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 13, 1983, Ser. No. 513,479
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1982, 3326504; Jun. 24, 1983, 3322866
Int. Cl.³ B22F *3/00*
U.S. Cl. 419—27 **9 Claims**

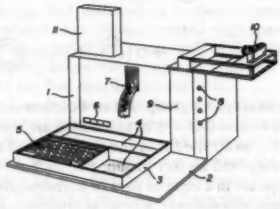
1. A method for producing a compound material of chromium and copper as contact material for medium voltage vacuum power swtiches, comprising the steps:
(a) pouring Cr powder into a degased mold;
(b) placing a piece of low-oxygen copper on the Cr powder;
(c) closing the mold with a porous cover;
(d) degasing the mold in a high-vacuum furnace at room temperature until a pressure of better than 10^{-4} mb is reached;
(e) increasing the furnace temperature to as high as possible a temperature below the melting point of copper;
(f) maintaining the furnace temperature at a constant level until a constant internal pressure in the furnace of better than 10^{-4} mb is reached; and
(g) increasing further the furnace temperature, without intermediate cooling, to a final value of 100 degree K. to 200 degree K. above the melting point of copper and maintaining this temperature until the porosity contained in the Cr powder is completely filled up by liquid copper.

4,503,011

APPARATUS FOR DETERMINING THE BLOOD GROUP OF AN INDIVIDUAL

Jean-Pierre Hubeau, Montigny-Le-Tilleul, Belgium, assignor to Finamex Finance Corporation, Panama, Panama

Filed Nov. 15, 1982, Ser. No. 441,618
Claims priority, application Switzerland, Nov. 18, 1981, 7400/81
Int. Cl.³ G01N *33/48, 35/02*
U.S. Cl. 422—73 **2 Claims**



1. An apparatus for analyzing a blood sample which is mixed with an agglutinating reactant and subjected to optical density analysis, which comprises: a carrier plate provided with a centrally located aperture; means for horizontally mounting said carrier plate for lateral reciprocating movement and for rocking motion about a horizontal axis perpendicular to the axis of lateral movement; a transparent plate mounted in said centrally located aperture provided with a plurality of parallel lines forming a grid; a blood sample analysis holder mounted on the top surface of said carrier plate above said grid plate provided with a plurality of agglutinating reactant cavities and a corresponding number of elongated blood analysis cavities,

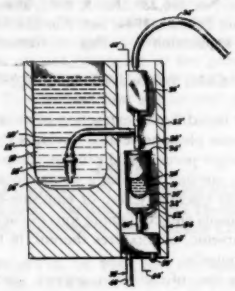
the center line of each analysis cavity coinciding with a centerline of a corresponding reactant cavity and the centerlines of all of the analysis cavities being perpendicular to the lines of said grid plate; a distribution needle block mounted for vertical reciprocating movement in which are mounted a plurality of distribution needles corresponding in number to the number of analysis cavities in said analysis holder; a pump block mounted for reciprocating movement in which are mounted a plurality of reciprocating distribution pumps corresponding in number to the number of distribution needles in the distribution needle block, each pump being connected by means of a flexible conduit to a corresponding distribution needle; and an optical density analyzer associated with said carrier plate and said grid plate comprising a plurality of analyzing units corresponding in number to the number of analyzing cavities in said analysis holder; the various described movements being synchronized so that, in sequence, agglutinating reactant is drawn from each agglutinating reactant cavity by its corresponding distribution pump into its corresponding distribution needle, the agglutinating reactant in each distribution needle is discharged into its corresponding blood analysis cavity for reaction with a blood sample, a rocking motion is applied to said carrier plate to mix the agglutinating reactant and blood sample in each blood analysis cavity, and the resultant agglutinating reactant-blood mixture in each analysis cavity is analyzed by its corresponding optical density analyzing unit functioning in conjunction with said grid plate.

4,503,012

REAGENT DISPENSING SYSTEM

Maurice Starr, Indianapolis, Ind., assignor to American Monitor Corporation, Indianapolis, Ind.

Filed Apr. 19, 1983, Ser. No. 486,330
Int. Cl.³ G01N *1/14*
U.S. Cl. 422—100 **15 Claims**



1. A liquid-transfer system, for dispensing predetermined metered amounts of liquid from a supply chamber to and out of a dispenser outlet, the system comprising:

a supply chamber which is kept open to atmospheric pressure,

a liquid-inlet line extending into the supply chamber,

a check valve means in the liquid-inlet line, permitting liquid flow in only a dispensing direction,

a dispenser outlet means,

a pumping means comprising a pumping chamber operatively on one side of a deformable bladder means mounted in a housing body, the other side of the bladder means being open to an actuation air means, the actuation air means operatively communicating with a source of air under pressure for achieving a pumping-stroke actuation of the bladder means, with associated control means for the actuation air means, and

a valve means in the dispenser outlet means, with associated control means for said dispenser outlet means valve means,

the liquid inlet line communicating with the pumping chamber and the dispenser outlet means,

the air actuation means and the dispenser outlet means valve means, and their respective associated control means, being operable to achieve a pumping operativity of the pumping means and a separate control of the dispensing of predetermined metered amounts of liquid through the dispenser outlet means, whereby optionally-selected amounts of liquid can be dispensed by controlling the length of time during which the dispenser outlet means valve means is in a setting such that there is open communication between the pumping chamber and the despenser outlet means,

the associated control means for the actuation air means and the associated control means for the dispenser outlet means valve means being co-ordinated so that the time interval during which there is open communication between the pumping chamber and the dispenser outlet means is shorter than and occurs during the time interval during which the pumping chamber is under pressure of actuating air,

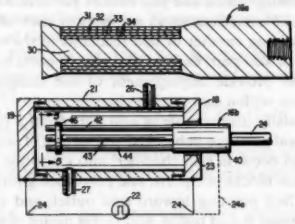
whereby the predetermined amount of liquid dispensed, at any given pressure exerted upon the pumping chamber, is a function of the time during which the dispenser outlet means valve means provides communication between the pumping chamber and the dispenser outlet means even though the supply chamber is of non-pressurized nature.

4,503,013

ULTRA-HIGH POWER EXPLODING WIRE SYSTEMS

Frank E. Lowther, Chatsworth, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 11, 1983, Ser. No. 484,060
Int. Cl.³ B01J *19/08, 19/10*
U.S. Cl. 422—127 **7 Claims**



1. An ultra-high power, exploding wire system for enhancing chemical and/or physical reactions comprising:

a reactor comprising a housing having an inlet and an outlet, said housing being constructed of an electrically insulative material;

an end cap constructed of an electrically conductive material affixed to each end of said housing to close said housing;

an explodible element slidably mounted through one of said end caps and being movable into and out of contact with the other of said end caps; said explodible element comprising:

a body; and

a plurality of separate explodible members carried by said body;

means electrically connected to said body of said explodible element and to the other of said end caps to supply electrical power thereto; and

means to move said explodible element into and out of contact with said other of said end caps whereby at least one of said explodible members will be exploded each time

said explodible element contacts said other of said end cap.

4,503,014

MIXING HEAD

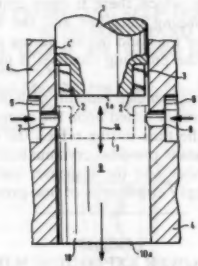
Adolf Bauer, Olching, Fed. Rep. of Germany, assignor to Krauss-Maffei AG, Munich, Fed. Rep. of Germany

Filed Jan. 27, 1983, Ser. No. 461,632

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1982, 3006996; Oct. 15, 1982, 3238258

Int. Cl.³ B01F *5/04, 15/02*

U.S. Cl. 422—135 **13 Claims**



1. A mixing head for a plurality of reactants comprising:

means defining a bore forming a mixing chamber and having an outlet at one end thereof;

means defining at least one pair of inlet ports, means supplying one of said reactants to one port of each of said pair and supplying another of said reactants to the other port of each of said pair, each of said pair of ports being positioned to provide impingement of the streams issuing therefrom within said mixing chamber; and

a piston axially displaceable in said bore from a position in which said ports are unblocked and mixing of said components can occur in said chamber, into a position in which said piston blocks said ports, said piston being formed with an end face pointing toward said outlet, and respective recess means in said piston, said recess means opening into said end and being open toward the respective ports for intercepting the respective streams just before said piston blocks said port in order to divert said issuing streams out of direct impingement with each other during the piston movement.

4,503,015

METHOD OF REMOVING ARSENIC FROM A COPPER ELECTROLYTE

Rolf Marr; Hans-Jörg Bart, both of Graz, and Reinhard Wachter, Braunau, all of Austria, assignors to Vereinigte Metallwerke Ranshofen-Berndorf AG, Braunau am Inn, Austria

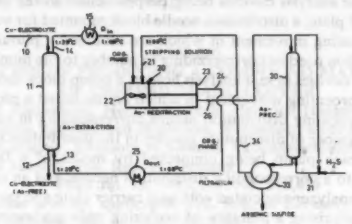
Filed Oct. 18, 1983, Ser. No. 543,122

Claims priority, application Austria, Oct. 19, 1982, 3841/82; Jul. 20, 1983, 2656/83

Int. Cl.³ C01B *27/00, 29/00*

U.S. Cl. 423—24 **11 Claims**

1. A method of removing arsenic from a copper-containing aqueous electrowinning electrolyte containing same, comprising the step of extracting said electrolyte with an extracting



medium consisting of 0.1 to 2.6 moles of trioctylphosphinicoxide per kg in an organic solvent.

4,503,016

PROCESS FOR EXTRACTING HEAVY METAL IONS FROM AQUEOUS SOLUTIONS

Günther Schimmel, Erftstadt; Werner Krause, and Reinhard Gradl, both of Hürth, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 396,239, Jul. 8, 1982, abandoned. This application Feb. 23, 1984, Ser. No. 582,138

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1981, 3127900

Int. Cl.³ C01G *3/00, 11/00, 9/00, 28/00*

U.S. Cl. 423—24 **6 Claims**

1. A process for liquid/liquid extraction of metal ions from contaminated aqueous phosphoric acid having a P_2O_5-content of from 3 to 80 weight-percent said process comprising:

(a) selecting as a starting material a contaminated aqueous phosphoric acid essentially free of emulsion-forming organic contaminants and containing ions of cadmium, copper, zinc, or arsenic, or mixtures thereof, in the form of complex compounds;

(b) extracting the ions of cadmium, copper, zinc or arsenic from said phosphoric acid by contacting said phosphoric acid with an extracting agent consisting essentially of a water-insoluble dithiophosphoric acid diester, thereby obtaining an aqueous phosphoric acid phase containing less of the said ions and a diester phase containing the said extracting agent;

(c) separating the aqueous phosphoric acid phase from the phase of the extracting agent;

(d) reextracting said cadmium, copper, zinc or arsenic from said diester phase by treating the diester phase separated from the aqueous phosphoric acid phase with an aqueous solution of an alkaline compound and obtaining thereby an aqueous alkaline extract;

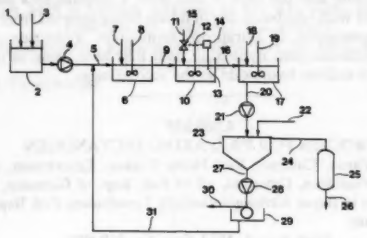
(e) extracting thereafter the diester phase with an aqueous hydrohalic acid solution;

(f) mixing the hydrohalic acid-containing solution resulting from (e) with the alkaline extract obtained from (d) along with any necessary alkaline compound to obtain a mixture having a pH of at least 7, whereby hydroxides of the cadmium, copper, zinc or arsenic are precipitated and separating the precipitated hydroxides from the mixture.

4,503,017
METHOD OF PURIFYING WASTE AQUEOUS SOLUTIONS FROM HEAVY METALS

Rolf K. Gadd, Skelleftehamn, Sweden, and Anna C. Sund-Hagelberg, Vaerlose, Denmark, assignors to Boliden Aktiebolag, Stockholm, Sweden

PCT No. PCT/SE81/00060, § 371 Date Oct. 1, 1981, § 102(e) Date Oct. 1, 1981, PCT Pub. No. WO81/02569, PCT Pub. Date Sep. 17, 1981
Continuation of Ser. No. 308,549, Oct. 1, 1981, abandoned. This PCT application Mar. 4, 1981, Ser. No. 558,552
Claims priority, application Sweden, Mar. 5, 1980, 8001720
Int. Cl.³ C01G 9/00, 11/02, 19/00
U.S. Cl. 423—87 2 Claims

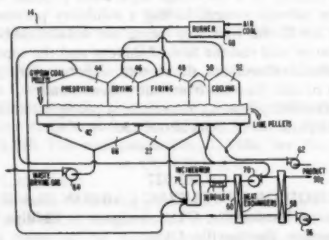


1. A method for purifying an acid aqueous solution containing heavy metals of which at least one of the elements arsenic, antimony, mercury and tin is present in considerable amounts and of which at least one of the elements iron, zinc, nickel and cobalt also is present, by chemical precipitation with sulphide ions, comprising charging sulphide ions to the solution at a first pH lower than 3.4, precipitating a first heavy metal precipitate, adjusting the acidity upwardly to a second pH of approximately 4 by adding a base containing no sulphide ions, adding sulphide ions to said precipitate containing solution, to precipitate any metal present belonging to the group consisting of iron, zinc, nickel and cobalt as a second precipitate and thereafter removing the resultant first and second precipitates from the solution.

4,503,018
DESULFURIZATION OF PHOSPHOGYPSUM

Samuel A. Gardner, Lakeland, Fla., and Thomas E. Ban, South Euclid, Ohio, assignors to Davy McKee Corporation, Lakeland, Fla.

Filed Feb. 14, 1983, Ser. No. 466,111
Int. Cl.³ C01B 17/50; C01F 11/08
U.S. Cl. 423—168 14 Claims



1. A process for producing sulfur and/or sulfur dioxide from gypsum comprising the steps of:
forming a mixture of fine carbon material and fine gypsum material,
balling the mixture to form pellets,
charging the pellets to a travelling grate,
moving the travelling grate to carry the charge of pellets successively through firing and post firing zones,
heating the charge on the grate in the firing zone under non-oxidizing conditions to produce a gaseous effluent containing sulfur dioxide or sulfur or both sulfur and sulfur dioxide, and
passing a portion of the gaseous effluent from the firing zone through the charge in the post firing zone.

4,503,019
BLENDS OF MAGNESIUM OXIDE AND COPPEROXYCHLORIDE AS CALCIUM OXIDE DEPOSIT INHIBITORS IN COAL FIRED LIME KILNS

Rabindra K. Sinha, Coraopolis, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.

Filed Apr. 10, 1984, Ser. No. 598,766
Int. Cl.³ C01F 11/04, 11/06
U.S. Cl. 423—175 1 Claim

1. A method of inhibiting and dispersing calcium oxide deposit formation in coal-fired lime kilns, comprising burning the coal in the presence of from 0.1 to 5 pounds/ton of coal of a blend of 80 to 95%, by weight, magnesium oxide and 5 to 20%, by weight, copperoxychloride.

4,503,020
METHOD OF PRODUCING CALCIUM SULFATE SEMIHYDRATE IN CONJUNCTION WITH THE DESULFURIZATION OF FLUE GASES

Helmut Weissert, Bochum-Hiltrop, and Karl-Rudolf Hegemann, Essen-Bergerhausen, both of Fed. Rep. of Germany, assignors to Gottfried Bischoff Bau kompl. Gasreinigungs- und Wasserrückkühlanlagen GmbH & Co. Kommanditgesellschaft, Essen, Fed. Rep. of Germany

Filed Oct. 28, 1983, Ser. No. 546,486
Claims priority, application Fed. Rep. of Germany, Oct. 30, 1982, 3240317
Int. Cl.³ C01B 17/00; C01F 1/00, 11/46
U.S. Cl. 423—242 6 Claims

1. A method of producing calcium sulfate alpha semihydrate in conjunction with the desulfurization of a flue gas comprising the steps of:
(a) treating a flue gas containing sulfur compounds in a scrubbing column with a lime-containing aqueous scrubbing suspension and collecting said suspension in a sump of said column whereby said suspension includes sulfite;
(b) introducing oxygen in the form of air or oxygen enriched air directly into said column to oxidize sulfite to sulfate and form calcium sulfate dihydrate in the suspension in said sump;
(c) recirculating said suspension from said sump through said column so that said suspension has a mean residence time in such recirculation of substantially 5 to 25 hours;
(d) maintaining the temperature of the recirculated suspension during the recirculation thereof at substantially 45° to 50° C.;
(e) during such recirculation, feeding a portion of the recirculated suspension to a thickener and recovering from said thickener a sludge containing calcium sulfate dihydrate crystals of a particle size distribution such that at least 90% has a particle size about 100 microns;
(f) dewatering the resulting sludge;
(g) treating the dewatered calcium sulfate dihydrate from step (f) with sulfuric acid at a temperature of at most 100° C. to convert it to calcium sulfate alpha semihydrate; and
(h) washing the alpha semihydrate with water.

4,503,021

PREPARATION OF TITANIUM DIBORIDE POWDER

Jorulf Brynestad, and Carlos E. Bamberger, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Apr. 26, 1983, Ser. No. 488,870
Int. Cl.³ C01B 35/04
U.S. Cl. 423—297 1 Claim

1. An improved method for preparing titanium diboride powder consisting essentially of reacting, at a temperature in the range 600°–1100° C., boron trichloride with titanium powder in the presence of sufficient additional amount of titanium powder to act as chlorine acceptor, for a period of time sufficient to form titanium diboride powder product having a particle size in the range 0.001–0.1 microns.

4,503,022

PROCESS FOR OXIDATION OF WET PROCESS PHOSPHORIC ACID

Kalyan K. Majumdar, Lakeland, Fla., assignor to International Minerals & Chemical Corp., Terre Haute, Ind.

Filed Aug. 23, 1982, Ser. No. 410,199
Int. Cl.³ C01B 25/16
U.S. Cl. 423—321 R 8 Claims

1. A method for oxidation of reduced cations and humate constituents of filtered, wet process phosphoric acid comprising the step of treating the acid with an oxygen source in an amount of about 0.06 to 0.84 g of oxygen per gallon of acid at or shortly before the acid enters an activated carbon bed.

4,503,023

SILICON SUBSTITUTED ZEOLITE COMPOSITIONS AND PROCESS FOR PREPARING SAME

Donald W. Breck, deceased, late of White Plains, N.Y.; by Harold Blass, executor, Scarsdale, and Gary W. Skeels, Brewster, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 066,330, Aug. 14, 1979, abandoned. This application Oct. 28, 1981, Ser. No. 315,853
Int. Cl.³ C01B 33/28
U.S. Cl. 423—328 20 Claims

1. Method for inserting silicon atoms as SiO_4 tetrahedra into the crystal lattice of an aluminosilicate zeolite which comprises contacting a crystalline zeolitic aluminosilicate having a SiO_2/Al_2O_3 molar ratio of at least 3 and pore diameters of at least 3 Angstroms with a fluorosilicate salt in an amount of at least 0.0075 moles per 100 grams of the zeolitic aluminosilicate on an anhydrous basis, said fluorosilicate salt being in the form of an aqueous solution having a pH value within the range of 3 to about 7 and brought into contact with the zeolitic aluminosilicate at a rate sufficiently slow to preserve at least 60 percent of the crystallinity of the starting zeolitic aluminosilicate.

16. Zeolitic aluminosilicate composition having in the dehydrated state, a chemical composition expessed in terms of mole ratios of oxides

$$0.9\pm0.1M_{2/n}O:Al_2O_3:XSiO_2$$

wherein "M" is a cation having the valence "n" and "x" is a value greater than 8, an X-ray powder diffraction pattern having at least the d-spacings set forth in Table E, and having extraneous silicon atoms in its crystal lattice in the form of framework SiO_4 tetrahedra.

4,503,024

PROCESS FOR THE PREPARATION OF SYNTHETIC ZEOLITES, AND ZEOLITES OBTAINED BY SAID PROCESS

Michel Bourgogne, Riedisheim; Jean-Louis Guth, Brunstatt, and Raymond Wey, Mulhouse, all of France, assignors to Compagnie Francaise de Raffinage, Paris, France

Filed Sep. 13, 1982, Ser. No. 417,793
Claims priority, application France, Sep. 14, 1981, 81 17343
Int. Cl.³ C01B 33/28
U.S. Cl. 423—328 35 Claims

1. A process for the preparation of synthetic ZSM 5 and ZSM 11 zeolites, said process comprising subjecting a zeolite selected from the group consisting of mordenite, ferrierite, clinoptilolite and the type X and type Y zeolites to a single treatment with two bases, the first base being selected from the group consisting of tetrapropylammonium hydroxide and tetrabutylammonium hydroxide, said first base being in mixture with sodium hydroxide as the second base.

4,503,025

PROCESS FOR PREPARING DICYANOGEN

Rudolf Fauss, Cologne; Karl-Heinz Linker, Leverkusen, and Kurt Findeisen, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 1, 1983, Ser. No. 518,899
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1982, 3229415
Int. Cl.³ C01C 3/00
U.S. Cl. 423—384 13 Claims

1. A process for preparing dicyanogen which comprises contacting trimethylsilyl cyanide with a cyanogen halide in the presence of a Lewis acid at a temperature of −20° to 200° C.

4,503,026

SPINNABLE PRECURSORS FROM PETROLEUM PITCH, FIBERS SPUN THEREFROM AND METHOD OF PREPARATION THEREOF

Ghazi Dickakian, Greenville, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 14, 1983, Ser. No. 475,068
Int. Cl.³ D01F 9/12
U.S. Cl. 423—447.4 10 Claims

1. A process for preparing a pitch suitable for spinning into carbon fibers from a carbonaceous residue having a high degree of aromaticity and high carbon content obtained from thermal, steam and catalystic cracking of petroleum distillates which consists of the following sequential steps:

(a) heating said carbonaceous residue to elevated temperatures under vacuum to effect deoiling;

(b) subjecting the resulting vacuum deoiled molten carbonaceous residue to a two-stage separation process with an organic solvent system having a solubility parameter of about 8–9.5, the first step being the solubilization of a fraction of said residue in said solvent and the separation of insolubles therefrom, the second stage being the precipitation of said fraction from said solvent; and

(c) then thermally heating the resulting precipitated fraction at a temperature of from about 250°–450° C.

4,503,027

METHOD OF PRODUCING CARBON BLACK

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 29, 1983, Ser. No. 518,720
Int. Cl.³ C01B 31/02; C09C 1/48
U.S. Cl. 423—450 6 Claims

1. A process comprising producing a carbon black in a furnace process by charging a carbonaceous feedstock and combustion gases to a carbon black reactor, said carbon black having a nitrogen surface area in the range of 60–160 m^2/g, a

CTAB surface area in the range of 60–140 m^2/g, a compressed DPB value in the range of 60–130 $cm^3/100$ g, and a tint strength in the range of 90–130, and a photelometer outside of the range of 65–75 in toluene or 92–96 in chloroform;

measuring the photelometer of the carbon black; and

adjusting the rate at which carbonaceous feedstock is introduced into the reactor up or down so that the photelometer of the carbon black is in the range of 65–75 in toluene or 92–96 in chloroform.

4,503,028

METHOD IN THE PRODUCTION OF HYDROGEN PEROXIDE

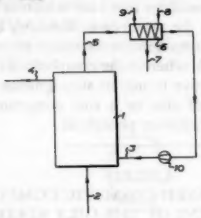
Bengt G. Franzén, Torslanda, and Wolfgang Herrmann, Gothenburg, both of Sweden, assignors to Eka AB, Surte, Sweden

Filed Sep. 29, 1982, Ser. No. 428,435

Claims priority, application Sweden, Oct. 22, 1981, 8106244

Int. Cl.³ C01B *15/02*

U.S. Cl. 423—588 **1 Claim**



1. A method for the production of hydrogen peroxide by the anthraquinone process in which anthraquinone derivatives are dissolved in a working solution which is successively and repeatedly subjected to a hydrogenation step, to an oxidation step wherein said hydrogenated working solution is oxidized with air at a pressure substantially above atmospheric pressure, and to an extraction step wherein hydrogen peroxide is extracted from the oxidized working solution with water, said working solution then being recycled through a drying zone prior to the hydrogenation step, the improvement comprising conducting exhaust gases from said oxidation step to said drying zone for said working solution, said drying zone being maintained at about atmospheric pressure, the relative moisture in said exhaust gases being reduced as a result of the reduction in pressure from said oxidation step to said drying zone, and said working solution in said drying zone being contacted with said exhaust gases at a temperature of from about 35–70° C. to effect the drying of said working solution to a relative moisture of 20–98%.

4,503,029

STEAM REFORMING UTILIZING HIGH ACTIVITY CATALYST

Herbert J. Setzer, Ellington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

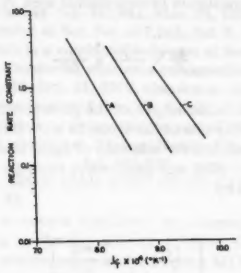
Continuation of Ser. No. 456,652, Jan. 10, 1983, abandoned, which is a division of Ser. No. 333,841, Dec. 23, 1981, Pat. No. 4,414,140. This application Mar. 1, 1984, Ser. No. 583,304

Int. Cl.³ C01B *1/02*

U.S. Cl. 423—652 **7 Claims**

1. In a steam reforming process for converting hydrocarbon material to hydrogen gas in the presence of sulfur comprising adding steam to the hydrocarbon material and passing the steam and hydrocarbon material over catalyst material at elevated temperatures, wherein the improvement comprises utilizing as a catalyst material high activity, sulfur tolerant catalyst of rhodium supported on lanthanum stabilized alumina or magnesium promoted lanthanum stabilized alumina.

2. In a steam reforming process for converting hydrocarbon material to hydrogen gas in the presence of sulfur comprising adding steam to the hydrocarbon material and passing the steam and hydrocarbon material over catalyst material at elevated temperatures, wherein the improvement comprises utilizing as a catalyst material high activity, sulfur tolerant catalysts consisting essentially of nickel supported on magnesium promoted lanthanum stabilized alumina.



4,503,030

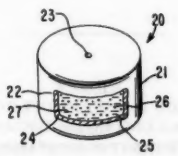
DEVICE FOR DELIVERING DRUG TO CERTAIN PH ENVIRONMENTS

David Edgren, El Granada; Patrick S. L. Wong, Hayward, and Felix Theeuwes, Los Altos, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Jun. 6, 1983, Ser. No. 501,573

Int. Cl.³ A61K *9/24, 9/22, 9/32, 9/36*

U.S. Cl. 424—15 **5 Claims**



1. An oral osmotic device for the delivery of a beneficial agent to the stomach as a first environment of use and to the intestine as a second environment of use, the device comprising:

(a) a shaped wall formed of (1) a semipermeable material that is permeable to the passage of an exterior fluid, substantially impermeable to the passage of agent, and maintain its physical and chemical integrity in both the first and second environment, said semipermeable material a member selected from the group consisting of a cellulose ester, cellulose ether, cellulose ester-ether, cellulose acylate, cellulose diacylate, cellulose triacylate, cellulose acetate, cellulose diacetate, cellulose triacetate, and cellulose diesters, and blended therewith (2) a pH sensitive material that is permeable to the passage of an exterior fluid, substantially impermeable to the passage of agent, maintains its physical and chemical integrity in the first environment and loses its physical and chemical integrity in the second environment, said material a member selected from the group consisting of cellulose carboxylic acid ester, cellulose carboxylic acid ether, cellulose ethyl phthalate, cellulose acetate phthalate, starch acetate phthalate, amylose acetate phthalate, hydroxypropyl methylcellulose phthalate, hydroxypropyl ethylcellulose phthalate, hydroxybutyl methylcellulose phthalate, cellulose acetate hexahydrophthalate, and hydroxypropyl methylcellulose hexahydrophthalate;

(b) a compartment containing a dosage unit amount of a beneficial agent;

(c) a passageway through the wall connecting the compartment with the exterior of the device, the passageway having a maximum cross-sectional area, A_s defined by

$$\frac{L}{F} \times \frac{Q_p}{t} \times \frac{1}{DS}$$

wherein L is the length of the passageway (Q_p/t) is the mass delivery rate of the agent, D is the diffusion coefficient of agent, S is the solubility of agent in the fluid, and F is from 2 to 1000, said passageway having a minimum area A_s defined by

$$\left[\frac{Lv}{t} \times 8 \times \frac{\pi\eta}{\Delta P}\right]^{\frac{1}{4}}$$

wherein L is the length of the passageway, v/t is the agent solution volume delivery rate, π is 3.14, $\eta$is the viscosity of the agent solution dispensed from the osmotic device, and ΔP is the hydrostatic pressure difference between the inside and the outside of the compartment having a value up to 20 atmospheres; and

(d) wherein, when the osmotic device is in the first environment, the device maintains its integrity and delivers agent through the passageway at a controlled rate over a prolonged period of time, and when the device is in operation in the second environment, the device loses its integrity and delivers the remaining agent in a short period of time.

4,503,031

SUPER-FAST-STARTING-SUSTAINED RELEASE TABLET

Jacob A. Glassman, 1680 Michigan Ave., Miami Beach, Fla. 33139

Continuation-in-part of Ser. No. 436,930, Dec. 17, 1982, abandoned. This application Mar. 12, 1984, Ser. No. 588,904

Int. Cl.³ A61K *9/24, 9/46, 9/44*

U.S. Cl. 424—15 **9 Claims**

1.

(a) A medically active tablet including top and bottom layers of compressed medically inert granular-like matrix material,

(b) a number of pure unadulterated pellets of active medicament embedded in the matrix material of the bottom layer

(c) an enteric coating on each of said pellets resistant to stomach juices,

(d) the matrix material of the said bottom layer being strongly compressed to resist rapid release of the pellets,

(e) said top layer being lightly compressed, a quantity of pure unadulterated uncoated pellets of active medicament embedded in the matrix material of the top layer,

(f) at least one groove in the said top layer dividing it into segments, and

(g) a midlayer including an effervescent mixture of a bicarbonate and an acid arranged between said two layers,

(h) said midlayer securing said two layers together and being subject to rapid dissolution by fluid and stomach juices to separate the segments from the bottom layer and obtain quick dissolution and immediate absorption of the active drug in said segments and a super-fast therapeutic start.

4,503,032

HYDROGEN-PHOSPHIDE RELEASING COMPOSITIONS AND THEIR USE

Wolfgang Friemel, Heppenheim, and Reiner Ehret, Weinheim, both of Fed. Rep. of Germany, assignors to Dr. Werner Freyberg Chemische Fabrik Delitia Nachf, Laudenbach, Fed. Rep. of Germany

Continuation of Ser. No. 215,586, Dec. 11, 1980, abandoned. This application Oct. 26, 1982, Ser. No. 436,769

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1979, 2950999

Int. Cl.³ A01N *25/18, 59/26, 59/16*

U.S. Cl. 424—40 **26 Claims**

1. In a hydrogen-phosphide releasing pesticidal composition comprising particulate aluminum phosphide in intimate admixture with an auto-ignition inhibitor which comprises a source of ammonia or ammonium ions which is decomposable to yield NH_3 under conditions under which the aluminum phosphide is hydrolyzed or which is capable of dissociating in the presence of water to yield ammonium ions and which is effective to inhibit auto-ignition in the presence of humidity but which is ineffective to inhibit auto-ignition in the presence of liquid water, the improvement wherein the composition further comprises an amount effective to inhibit auto-ignition in the presence of liquid water of zinc or a zinc compound which is compatible with the aluminum phosphide.

4,503,033

DITHIOETHER-BASED COSMETIC COMPOSITION FOR THE TREATMENT OF THE OILY STATE OF HAIR AND SKIN

Claude Bouillon, Eaubonne, and Jean Maignan, Tremblay les Gonesse, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

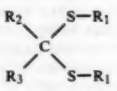
Division of Ser. No. 53,417, Jun. 29, 1979, Pat. No. 4,348,383. This application Jul. 26, 1982, Ser. No. 401,525

Claims priority, application France, Jul. 12, 1978, 78 20801

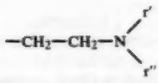
Int. Cl.³ A61K *7/06, 7/11*

U.S. Cl. 424—47 **28 Claims**

1. A cosmetic composition for the treatment of the oily appearance of the hair and skin comprising in combination, a suitable cosmetic vehicle and an effective amount of at least one active compound having the formula



wherein R_1 represents



wherein r' and r'' each independently represent hydrogen, 2-hydroxyethyl, 2-hydroxypropyl or 2,3-dihydroxypropyl,

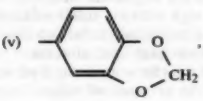
R_2 represents a member selected from the group consisting of

(i) $-CH_3$,

(ii) $-CO_2H$,

(iii) $-C_6H_5p-OCH_3$,

(iv) $-C_6H_5$,

(v) 

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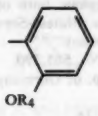
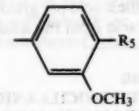
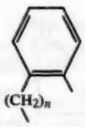
(vi) 

wherein R_4 represents $—CH_2COOH$ or $—COCH_3$and

(vii) 

wherein R_5 represents —OH, $—OCH_3$, $—OC_4H_9$ or $—OCH_2COOH$, and

R_3 represents hydrogen or methyl, or R_2 and R_3 together form a divalent radical of the formula $—(CH_2)_m—$, or of the formula



wherein m is 3–5 inclusive and n is 2–5 inclusive and the salts thereof.

4,503,034

PASTE FOR PROTECTING THE SKIN

Philippe Maupetit, Aulnay sur Bois, and Bernard Demoulin, St. Pee sur Nivelle, both of France, assignors to Laboratoires Biotrol S.A, Paris, France

Filed Sep. 2, 1983, Ser. No. 529,700

Claims priority, application France, Sep. 7, 1982, 82 15191

Int. Cl.³ A61K *31/79*

U.S. Cl. 424—80 **19 Claims**

1. A skin-protecting composition which is in paste form and comprises (in effective amounts):

(a) at least one hydrocolloid and/or another superabsorbent derived from hydrocolloids,

(b) an insolubilized carboxymethylcellulose,

(c) a polyvinylpyrrolidone having a molecular weight in the order of 25,000 to 30,000,

(d) demineralized water,

(e) an oil,

(f) a stearate, and

(g) a crosslinked and insolubilized polyvinylpyrrolidone.

4,503,035

PROTEIN PURIFICATION PROCESS AND PRODUCT

Sidney Pestka, North Caldwell, N.J., and Menachem Rubinstein, Rimon, Israel, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 247,442, Mar. 25, 1981, abandoned, which is a division of Ser. No. 167,165, Jul. 9, 1980, Pat. No. 4,289,690, which is a continuation-in-part of Ser. No. 106,644, Dec. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 77,710, Sep. 21, 1979, abandoned, which is a continuation-in-part of Ser. No. 62,374, Jul. 31, 1979, abandoned, which is a continuation-in-part of Ser. No. 963,257, Nov. 24, 1978, abandoned. This application Feb. 14, 1983, Ser. No. 465,979

Int. Cl.³ A61K *45/02;* **C07C** *103/52;* **C12P** *21/00*

U.S. Cl. 424—85 **14 Claims**

1. Human leukocyte interferon as a homogenous protein species having a specific activity of from 0.9×10^8–4×10^8 Units/mg. of protein when assayed on the MDBK bovine cell line and from 2×10^6–7.6×10^8 Units/mg. of protein when assayed on the AG 1732 human cell line.

4. A pharmaceutical preparation suitable for parenteral administration for treatment of viral and neoplastic disease states said preparation comprising a minor, effective amount of at least one human leukocyte interferon species according to claim 1 and a major amount of a conventional pharmaceutical parenteral carrier material.

4,503,036

PROCESS FOR PRODUCING A BIOCHEMICAL VACCINE AGAINST SALMONELLA INFECTION

Philippe Girardon, and Jean Amen, both of Versailles, France, assignors to L'Air Liquide, Societe Anonyme Pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Dec. 7, 1982, Ser. No. 447,503

Claims priority, application France, Dec. 10, 1981, 81 23067

Int. Cl.³ A61K *39/112;* **C12P** *21/00*

U.S. Cl. 424—92 **11 Claims**

1. Process for producing a bacterial vaccine for use against Salmonella infections comprising the following preparatory sequence:

fermentation in a suitable liquid medium of an avirulent strain of *Salmonella typhimurium* at a pH slightly above neutrality, in average aerobiosis, at a temperature between 33° and 35° C., for a period that is a function of the amount of inoculum;

centrifuging at a low speed, separation of the bacterial residue;

extraction of a vaccinating antigen fraction of molecular weight greater than 50,000 by putting the bacterial residue in contact with a weak solution of a solvent of the lower tris (hydroxyalkyl) aminoalkane class, with substantially constant stirring, at a temperature of about 0° to 4° C., pH adjusted between 8.4 and 8.6 for a period of at least about 60 hours;

decanting by very slight centrifuging, purification and fractionating of vaccinating antigens by ultrafiltration on membranes having cutting thresholds selected as a function of the desired molecular weights; dialysis of the fraction with the lower molecular weight;

freeze-drying of the vaccinating antigen fraction.

4,503,037

COMPOSITION FOR THE TREATMENT OF EPITHELIAL INJURIES AND PROCESS FOR THE PREPARATION THEREOF

Emília Szijjártó , and Magda Ráskai, both of Budapest, Hungary, assignors to Human Oltoanyagtermelö es Kutato Intezet, Gödöllö , Hungary

Continuation-in-part of Ser. No. 358,874, Mar. 16, 1982, abandoned. This application Sep. 21, 1982, Ser. No. 420,786
Claims priority, application Hungary, Mar. 17, 1981, 663
Int. Cl.³ A61K *37/48, 33/30, 33/26, 31/70*
U.S. Cl. 424—94 4 Claims

1. A process for the preparation of a composition for the treatment and post-treatment of burns, for the treatment of healing surgical wounds, or frozen skin surface and for promoting epithelization of wounds caused by abrasion or caustic materials which comprises the step of:

dissolving 2 to 28 mg of a tannic compound selected from the group consisting of pyrocatechol, tannic acid, gallic acid, digallic acid, catechol tannic acid, pentadigalloyl glucose and mixtures thereof, 5 to 30 mg of at least one carbohydrate selected from the group consisting of glucose, fructose, xylose and mixtures thereof, 0.5 to 6 mg of a compound selected from the group consisting of quercetine, cyanin, cyanidine, apigenine, delphinin, pectin, and mixtures thereof, 0.5 to 6 mg of a wax selected from the group consisting of carnauba wax, bee-wax and mixtures thereof, 0.01 to 0.1 mg of a volatile oil selected from the group consisting of geraniol, nerol, citronelol, eugenol, linalol, and corresponding aldehydes and mixtures thereof, and 5 to 6 mg of a combination containing a vitamin selected from the group consisting of Vitamin B_1, Vitamin B_6, Vitamin B_{12}, Vitamin C, and mixtures thereof, a trace element in the form of a pharmaceutically acceptable salt selected from the group consisting of iron and zinc salts, auxine as a plant hormone, and an oxidative enzyme selected from the group consisting of peroxidase, catalase, and mixtures thereof in a C_2–C_4 alkanol to obtain 100 ml of composition.

4,503,038

EXTRACELLULAR NONMITOGENIC ANGIOGENESIS FACTOR AND METHOD OF ISOLATION THEREOF FROM WOUND FLUID

Michael J. Banda; Zena Werb; David R. Knighton, and Thomas K. Hunt, all of San Francisco, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Feb. 25, 1983, Ser. No. 469,935
Int. Cl.³ A61K *35/12, 37/02*
U.S. Cl. 424—95 6 Claims

1. A method for isolating a nonmitogenic angiogenesis factor from rabbit wound fluid accumulated at the site of damaged tissue during the process of healing comprising the steps of

(a) clarifying said fluid by centrifugation;

(b) dialyzing the clarified fluid from step (a) with acetic acid at about 4° C.;

(c) removing insoluble material from the retentate from step (b) by centrifugation;

(d) dialyzing the clarified retentate from step (c) with water at about 4° C.;

(e) lyophilizing the dialysate from step (d);

(f) dissolving the product from step (e) in acetic acid;

(g) fractionating the solution from step (f) by size exclusion chromatography; and

(h) identifying a fraction from step (g) which exhibits angiogenic activity.

4,503,039

COAGULANT PLASMA-PROTEIN SOLUTION

Ronald Kotitschke, and Wolfgang Stephan, both of Dreieich, Fed. Rep. of Germany, assignors to Biotest-Serum-Institut GmbH, Frankfurt, Fed. Rep. of Germany

Filed Dec. 14, 1983, Ser. No. 561,390
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1982, 3247150
Int. Cl.³ A61K *35/16*
U.S. Cl. 424—101 11 Claims

1. A method of producing a coagulant plasma-protein solution comprising contacting stabilized human plasmä at least once with 20–40 mg of colloidal silicic acid per gram of plasma protein and separating the silicic acid from the solution.

4,503,040

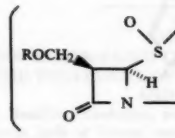
6-(AMINOACYLOXYMETHYL)PENICILLANIC ACID 1,1-DIOXIDES AS BETA-LACTAMASE INHIBITORS

Wayne E. Barth, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Feb. 27, 1984, Ser. No. 584,044
Int. Cl.³ C07D *499/00;* A61K *31/425*
U.S. Cl. 424—114 57 Claims

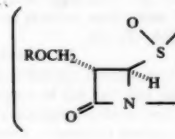
1. A compound having the formula

(I)



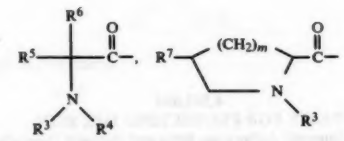
or

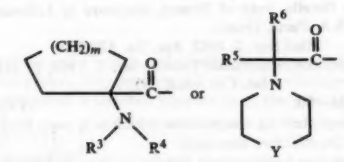
(II)



wherein

R is



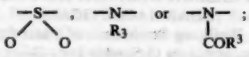


R^3, R^4 and R^5 are each independently hydrogen or (C_1–C_3)alkyl;

R^6 is hydrogen, (C_1–C_6)alkyl, phenyl or benzyl; or one of said (C_1–C_6)alkyl, phenyl or benzyl monosubstituted with —OR^3, —SR^8, —SO_2R^8, —NR^3R^4, —$NHCOR^3$, —$CONH_2$ or —$COOR^3$; with the proviso that when said substituent is —COOH, n is 1 and R^1 is hydrogen;

R^7 is hydrogen, hydroxy or —$OCOR^3$;

R^8 is (C_1–C_3)alkyl;
Y is $-(CH_2)_m-$; —O—, —S—,



m is 0, 1 or 2; and either
n is 1 and R^1 is hydrogen, a radical group forming an ester hydrolyzable under physiological conditions, or 1,1-dioxopenicillanoyloxymethyl; or
n is 2 and R^1 is $—CH_2—$; a pharmaceutically-acceptable acid addition salt thereof, or a pharmaceutically-acceptable cationic salt thereof when n is 1 and R^1 is hydrogen.

4,503,041
DERMATIC MEDICAMENT

Shinei Kashiwayama, No. 558 Iwasaki, Kamitonda-machi, Nishimuro-gun, Wakayama-ken, Japan

PCT No. PCT/JP80/00203, § 371 Date May 1, 1981, § 102(e) Date Apr. 27, 1981, PCT Pub. No. WO81/00723, PCT Pub. Date Mar. 19, 1981
PCT Filed Sep. 1, 1980, Ser. No. 261,167
Claims priority, application Japan, Sep. 1, 1979, 54-112294
Int. Cl.³ A61K *35/72*; C12P *1/02*; C12R *1/72*
U.S. Cl. 424—115 **8 Claims**

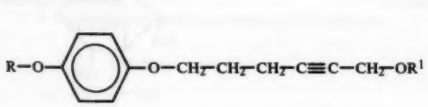
1. The product produced by culturing the strain *Trichosporon kashiwayama,* Ferm-P-4821 which is a strain belonging to the genus Geotricum or Endomycopsis, said strain (A) having cells which when cultured under aerobic or anaerobic conditions, exhibit a rectangular or oval shape and have arthrospores but no conidia and produce a fragrance from nutrients in a culture medium, (B) having the optimum growth pH in the range of from 4.0 to 6.0 and the optimum growth temperature in the range of from 20° to 30° C., (C) said product having mycological properties as a dermatic medicament.

4,503,042
ACARICIDE COMPOSITIONS

Vincenzo Caprioli, S. Martino; Angelo Longoni, and Pietro Massardo, both of Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Sep. 1, 1982, Ser. No. 413,830
Claims priority, application Italy, Sep. 2, 1981, 23726 A/81
Int. Cl.³ A01N *59/20, 55/02*
U.S. Cl. 424—141 **9 Claims**

1. An acaricide mixture consisting of (a) at least one compound of formula


(I)

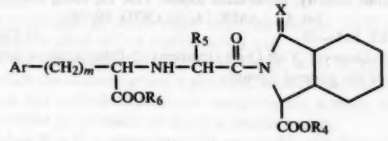
wherein
R is an alkyl C_8–C_{11} and
R^1 is a hydrogen atom or an alkyl C_1–C_4; and
(b) finely divided metallic copper or a copper compound selected from the group consisting of the oxide, hydroxide, organic and inorganic salts of mono- and divalent copper, and mixtures thereof, in a ratio ranging from 1:1 to 1:250 by weight, referred to the metallic copper or to the copper content of the copper compound.

4,503,043
SUBSTITUTED ACYL DERIVATIVES OF OCTAHYDRO-1H-ISOINDOLE-1-CARBOXYLIC ACIDS

Clifton J. Blankley, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 327,651, Dec. 7, 1981, , which is a continuation-in-part of Ser. No. 235,381, Feb. 17, 1981, abandoned. This application Jun. 14, 1982, Ser. No. 387,985
Int. Cl.³ A61K *37/00*; C07C *103/52*
U.S. Cl. 514—10 **7 Claims**

1. A substituted acyl derivative of an octahydro-1H-isoindole-1-carboxylic acid having the formula



wherein R_4 is hydrogen or lower alkyl; R_5 is hydrogen, lower alkyl or benzyl; R_6 is hydrogen or lower alkyl; Ar is phenyl or phenyl substituted with 1 or 2 substituents selected from the group consisting of fluorine, chlorine, bromine, lower alkyl, lower alkoxy, hydroxy or amino; and m is 0 to 3, =X is 0; wherein lower alkyl and lower alkoxy contain 1 to 4 straight or branched carbon atoms and the pharmaceutically acceptable basic salts thereof.

4,503,044
ANTIBIOTIC LL-D05139 β

May D. Lee, Monsey; Donald B. Borders, Suffern; David P. Labeda, Monsey; Amedeo A. Fantini, New City, all of N.Y., and Raymond T. Testa, Cedar Grove, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 25, 1983, Ser. No. 488,496
Int. Cl.³ A61K *37/00*; C07C *103/52*
U.S. Cl. 514—2 **4 Claims**

1. The compound N-L-alanyl-L-serine diazoacetate, designated as LL-D05139β, wherein the substantially pure form:
(a) has an optical rotation $[\alpha]_D^{26} = +57° \pm 5°$(C, 0.19%, water);
(b) produces one molar equivalent each of L-alanine and L-serine upon hydrolysis;
(c) has L-alanine as the N-terminal amino acid by an Edman degradation;
(d) has a characteristic ultraviolet spectrum as shown in FIG. I of the attached drawings;
(e) has a characteristic infrared spectrum as shown in FIG. II of the attached drawings;
(f) has a characteristic proton nuclear magnetic resonance spectrum as shown in FIG. III of the attached drawings (D_2O, ppm from TMS): 1.56(3H, d, J=7.4 Hz), 4.07(1H, q, J=7.4 Hz), 4.49(2–3H, m), 5.19(1H, broad s); and
(g) has a molecular weight of 244 (FAB-MS).

4,503,045

2'-DEOXY-3',5'-DI-O-ALKYLCARBONYL-5-FLUOROURIDINE DERIVATIVES, A PROCESS FOR THE PREPARATION OF THE DERIVATIVES AND ANTI-TUMOR AGENTS CONTAINING THE DERIVATIVES

Setsuro Fujii, Osaka; Bompei Yasui, Nara; Tomohisa Miyamoto, Osaka; Masatoshi Shiga, Osaka; Kazuko Ando, Osaka; Iwao Hashimoto, Osaka; Masahiro Kawasaki, Nara; Yoichiro Kawai, and Yuji Mino, both of Osaka, all of Japan, assignors to Funai Yakuhin Kogyo Kabushiki Kaisha, Osaka, Japan

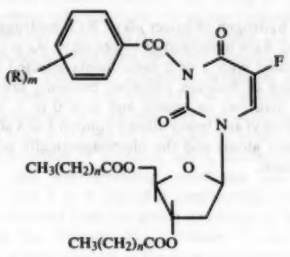
Filed Feb. 13, 1981, Ser. No. 234,569

Claims priority, application Japan, Feb. 15, 1980, 55-17408

Int. Cl.³ A61K *31/70*; C07H *19/08*

U.S. Cl. 514—25 **31 Claims**

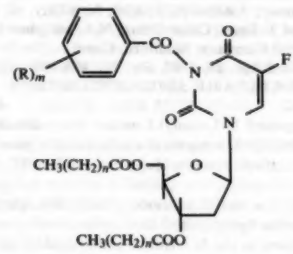
1. 2'-Deoxy-3',5'-di-O-alkylcarbonyl-5-fluorouridine derivatives of the general formula:



(I)

wherein R stands for an alkyl group, an alkoxy group or a halogen atom, m for zero or an integer of 1–3, and n for an integer of 1–2 or 5–14, with the proviso that when m is 2 or 3, R's may be the same or different and that when m is 2 and the adjacent two R's are alkoxy groups, the two alkyl moieties of the alkoxy groups may be combined to form together with the two adjacent oxa bridging members an alkylenedioxy group as a whole.

9. A pharmaceutical composition comprising an effective anti-tumor amount of at least one 2'-deoxy-3',5'-di-O-alkylcarbonyl-5-fluorouridine derivative of the general formula:



(I)

wherein R stands for an alkyl group, an alkoxy group or a halogen atom, m for zero or an integer of 1–3, and n for an integer of 1–2 or 5–14, with the proviso that when m is 2 or 3, R's may be the same or different and that when m is 2 and the adjacent two R's are alkoxy groups, the two alkyl moieties of the alkoxy groups may be combined to form together with the two adjacent oxa bridging members an alkylenedioxy groups as a whole and a pharmaceutically acceptable carrier or excipient.

4,503,046

1-NITRO-AMINOGLYCOSIDE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND SUCH DERIVATIVES FOR USE AS PHARMACEUTICALS

Hans Loibner; Wolfgang Streicher, and Peter Stütz, all of Vienna, Austria, assignors to Sandoz Ltd., Basel, Switzerland

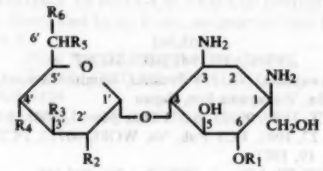
Filed Aug. 3, 1982, Ser. No. 404,817

Claims priority, application Switzerland, Aug. 7, 1981, 5107/81

Int. Cl.³ A61K *31/71*; C07H *15/22*

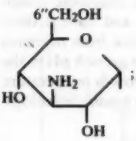
U.S. Cl. 514—40 **10 Claims**

1. A compound which is either a base of formula I

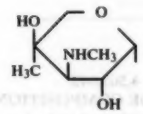


I

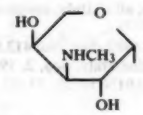
wherein R_1 represents hydrogen or a group of formula



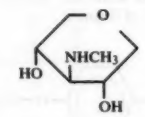
II



IIa



IIb



IIc

R_2 represents hydroxy or amino,

R_3 represents hydrogen or hydroxy,

R_4 represents hydrogen or hydroxy,

R_5 represents amino, methylamino, dimethylamino or, when R_2 represents amino also hydroxy and

R_6 represents hydrogen or methyl; or a chemotherapeutically acceptable acid addition salt thereof.

5. A method of combatting bacteria comprising administering to a subject in need of such treatment an effective amount of a compound of claim **1**.

4,503,047

COMPOSITIONS FOR STIMULATING KERATIN FORMATION IN HAIR BULBS EMPLOYING HORSERADISH AND MUSTARD SEED EXTRACTS

András Bánfi, Békéscsaba; János Leibinger, Budapest; László Molnár, Budapest; Gizella Nádori née Kozel, Budapest, and Sándor Tar, Balmazujváros, all of Hungary, assignors to Licencia Találmányokat Értékesitö Vállalat, Budapest, Hungary

Continuation of Ser. No. 256,823, Apr. 23, 1981, abandoned. This application Mar. 1, 1983, Ser. No. 470,997

Claims priority, application Hungary, Apr. 28, 1980, 1047/80

Int. Cl.³ A61K *35/78*

U.S. Cl. 424—195.1 **15 Claims**

1. Composition for stimulating keratin formation in hair bulbs comprising aqueous alcohol and the portion of edible horseradish which is soluble in 55 to 70% aqueous ethanol, characterized by also containing 8 to 2000 mg/l of allyl isothiocyanate and 600 to 6000 mg/l of at least one sulfur-containing amino acid selected from the group consisting of L-cysteine and DL-methionine.

4,503,048

PYRIDINE SOLUBLE EXTRACT OF A MICROORGANISM

John L. Cantrell, Hamilton, Mont., assignor to Ribi Immuno-Chem Research, Inc., Hamilton, Mont.

Continuation of Ser. No. 393,821, Jun. 30, 1982, abandoned. This application Jul. 18, 1984, Ser. No. 632,256

Int. Cl.³ A61K *35/78*

U.S. Cl. 424—195 **9 Claims**

1. A method of producing a purified pyridine-soluble extract of a microorganism selected from the group consisting of *M. smegmatis, M.phlei, Nocardia rubra, Nocardia asteroides, Corynebacterium diphtheriae, Corynebacterium parvum, M.Kansasii, M. tuberculosis* (strain H 37 RV and Ayoma B), *M. Bovis* Strain BCG, *E. coli, B. abortus* and *Coxielle burnetti,* comprising:

(a) preparing a whole cell paste of said microorganism;

(b) washing said paste;

(c) treating said paste with pyridine to produce an extract and a residue;

(d) removing said pyridine from said extract; and

(e) dialyzing said dried extract to obtain purified pyridine-soluble extract.

4,503,049

DIPHOSPHONIC ACID DERIVATIVES AND PHARMACEUTICAL PREPARATIONS CONTAINING THEM

Helmut Biere; Clemens Rufer, both of Berlin, Fed. Rep. of Germany, and Irmgard Boettcher, Basel, Switzerland, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

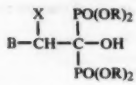
Filed Jan. 27, 1983, Ser. No. 461,411

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1982, 3203308

Int. Cl.³ A61K *31/66, 33/665;* **C07F** *9/38, 9/65*

U.S. Cl. 514—80 **18 Claims**

1. A diphosphonic acid derivative of the formula



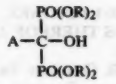
wherein

R is hydrogen, an alkali metal atom, an alkaline earth metal atom, or alkyl of 1–4 carbon atoms,

X is hydrogen, methyl, or ethyl, and

B is phenyl substituted in the para-position by cyclohexyl, or 1-pyrrolinyl and, optionally, additionally substituted in the meta-position by fluorine or chlorine; phenyl substituted in the meta-position by benzoyl or phenoxy; or phenyl substituted in the ortho-position by 2,4-dichlorophenoxy or 2,6-dichlorophenylamino.

16. A method of treating inflammation in a patient in need of such treatment comprising administering to the patient an antiinflammatorily effective amount of a diphosphonic acid derivative of the formula



wherein

R is hydrogen, an alkali metal atom, an alkaline earth metal atom, or alkyl of 1–4 carbon atoms and

A is the structural moiety of a carboxylic acid, ACOOH, to which the carboxy group is attached, wherein the carboxylic acid has antiinflammatory or antiphlogistic activity and A contains an aromatic or heteroaromatic group;

or when R is H, a physiologically acceptable salt thereof with an organic base.

4,503,050

SUBSTITUTED IMIDAZO[1,2-c]PYRIMIDINES

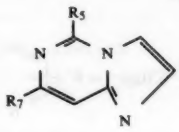
James J. Wade, Oakdale, Minn., assignor to Riker Laboratories, Inc., St. Paul, Minn.

Filed Jun. 2, 1983, Ser. No. 500,410

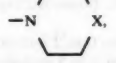
Int. Cl.³ A61K *31/505, 31/535, 31/54;* **C07D** *487/04*

U.S. Cl. 514—222 **15 Claims**

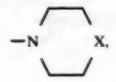
1. A compound of the formula



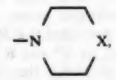
wherein R_5 is hydrogen, lower alkyl, lower alkoxy, lower alkylthio, phenyl, or



wherein X is oxygen, sulfur, sulfonyl, methylene, imido or N-lower alkylimido; R_7 is chlorine, lower alkyl, lower alkoxy, N-(lower alkyl)amino, N,N-di(lower alkyl) amino, or



wherein X is oxygen, sulfur, sulfonyl, methylene, imido or N-lower alkylimido; with the proviso that at least one of R_5 and R_7 is



wherein each X is as defined above, or R_5 is lower alkoxy and R_7 is lower alkoxy or chlorine, or R_5 is lower alkylthio and R_7 is lower alkyl or N-(lower alkyl)amino or N,N-di(lower alkyl-

)amino, or R_7 is lower alkoxy and R_5 is lower alkyl; or a pharmaceutically acceptable salt thereof.

14. A method for obtaining bronchodilation in a mammal wherein an effective amount of a compound according to claim 1 is administered to a mammal.

4,503,051

SUBSTITUTED 3-CYCLOBUTENE-1,2-DIONES, PHARMACEUTICAL COMPOSITIONS THEREOF AND METHODS OF USE

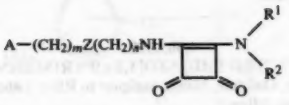
Aldo A. Algieri, Fayetteville, and Ronnie R. Crenshaw, Dewitt, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 369,971, Apr. 21, 1982, , which is a continuation-in-part of Ser. No. 264,533, May 18, 1981, Pat. No. 4,390,701. This application Jun. 13, 1983, Ser. No. 503,996

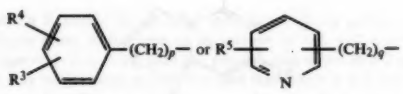
Int. Cl.³ C07D *417/14, 413/14, 419/14;* **A61K** *31/34, 31/55, 31/535;* **C07D** *307/46*

U.S. Cl. 514—183 **10 Claims**

1. A compound of the formula



wherein R^1 and R^2 each are independently hydrogen or (lower)alkyl, and, when R^1 is hydrogen, R^2 also may be allyl, propargyl, cyclo(lower)alkyl(lower)alkyl, cyclo(lower)alkyl, cyano(lower)alkyl, 2-fluoroethyl, 2,2,2-trifluoroethyl, hydroxy, 2,3-dihydroxypropyl,



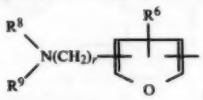
in which p is an integer of from 1 to 6 inclusive, q is an integer of from 1 to 6 inclusive, R^3 and R^4 each are independently hydrogen, (lower)alkyl, hydroxy, (lower)alkoxy or halogen, and, when R^3 is hydrogen, R^4 also may be trifluoromethyl, or R^3 and R^4, taken together, may be methylenedioxy, R^5 is hydrogen, (lower)alkyl, (lower)alkoxy, hydroxy, amino or halogen;

m is an integer of from 0 to 2 inclusive;

n is an integer of from 2 to 5 inclusive;

Z is sulfur, oxygen or methylene; and

A is



in which R^6 is hydrogen, (lower)alkyl, (lower)alkoxy or halogen;

r is an integer of from 1 to 4 inclusive; and

R^8 and R^9 each are independently hydrogen, (lower)alkyl, allyl, propargyl, (lower)alkoxy(lower)alkyl in which the (lower)alkoxy moiety is at least two carbon atoms removed from the nitrogen atom, cyclo(lower)alkyl, or phenyl(lower)alkyl, provided that R^8 and R^9 may not both be cyclo(lower)alkyl, or R^8 and R^9, taken together with the nitrogen atom to which they are attached, may be pyrrolidino, methylpyrrolidino, dimethylpyrrolidino, morpholino, thiomorpholino, piperidino, methylpiperidino, dimethylpiperidino, hydroxypiperidino, N-methylpiperazino, 1,2,3,6-tetrahydropyridyl, 3-pyrrolino, homopiperidino, heptamethyleneimino, octamethyleneimino or 3-azabicyclo[3.2.2]nonane;

or a nontoxic, pharmaceutically acceptable salt, hydrate or solvate thereof.

10. A method of inhibiting histamine H_2-receptors in an animal in need thereof comprising administering to said animal an effective histamine H_2-receptor inhibiting amount of at least one compound of claim 1.

4,503,052

7-(2-(SUBSTITUTED CINNOLINOYL)AMINO)ACETAMIDO)-1-OXA-BETA-LACTAMS

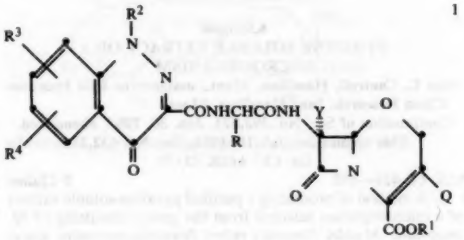
William H. W. Lunn, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

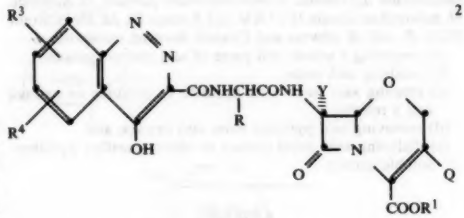
Filed May 16, 1983, Ser. No. 494,830

Int. Cl.³ A61K *31/535;* **C07D** *498/04*

U.S. Cl. 514—210 **32 Claims**

1. A compound of formula 1 or 2:





wherein:

R is phenyl which is optionally substituted by one or two hydroxy or C_1–C_3-alkoxy groups; cyclohexadienyl; cyclohexenyl; or 2-thienyl, 3-thienyl, 2-furyl, 3-furyl or 2-aminothiazol-4-yl, each of which is optionally substituted by one or two C_1–C_3-alkyl groups;

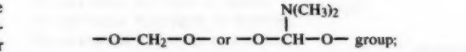
R^1 is hydrogen, a carboxy-protecting group or a biologically labile ester group;

R^2 is hydrogen, C_1–C_3-alkyl, acetyl, or C_1–C_3-alkylsulfonyl;

R^3 is hydroxy, C_1–C_3-alkoxy, C_1–C_3-alkyl, halo, C_2–C_4-alkanoyloxy, C_1–C_3-alkylsulfonyl, or C_1–C_4-alkylaminocarbonyloxy; and

R^4 is hydrogen or R^3; or

R^3 and R^4, when taken together on adjacent carbon atoms, form an



Y is hydrogen or methoxy;

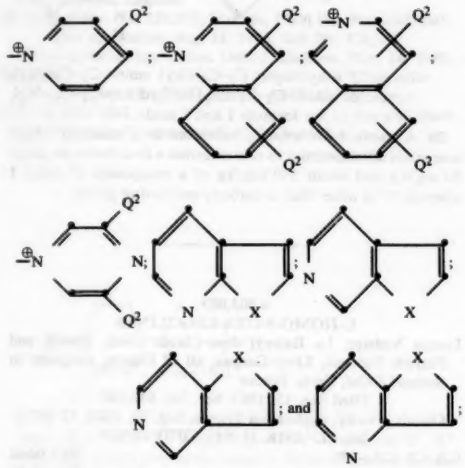
Q is halo, methoxy, methyl or a group of the formula $—CH_2Q^1$ wherein

Q^1 is

(a) C_2–C_4-alkanoyloxy;

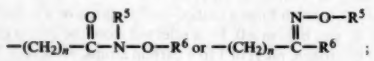
(b) carbamoyloxy or C_1–C_4-alkylcarbamoyloxy;

(c) C_1–C_4-alkoxy;
(d) chloro, bromo or iodo;
(e) a heteroaryl group selected from

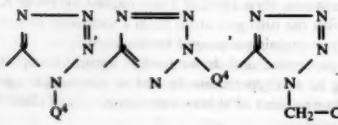


wherein
X is O, S, or —NH—;
Q^2 is hydrogen, C_1–C_4-alkyl,

halo, hydroxy, hydroxymethyl, trifluoromethyl, carbamoyl, C_1–C_4-alkylcarbamoyl, carboxy, cyano, C_1–C_3-alkanoyl,



and
R^5 and R^6, independently, are hydrogen or C_1–C_4-alkyl;
(f) a group of the formula $-SQ^3$
wherein Q^3 is
(a') C_1–C_4-alkyl, phenyl or phenyl substituted with 1 or 2 groups selected from the group consisting of C_1–C_4-alkyl, C_1–C_4-alkoxy, halo, hydroxy, nitro, cyano, methanesulfonamido and trifluoromethyl;
(b') a tetrazolyl group selected from



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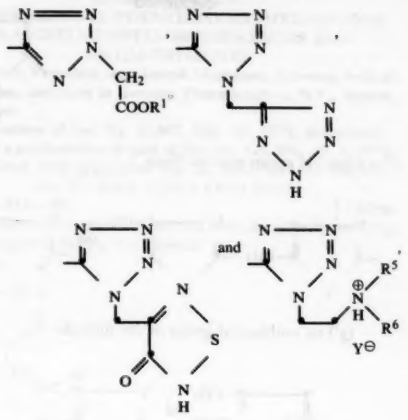
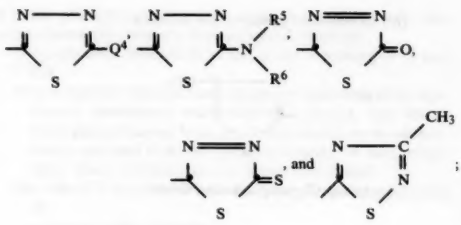
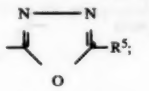


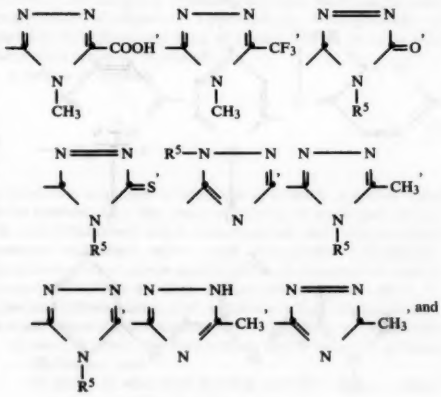
wherein Y is halo,
(c') a thiadiazolyl group selected from



(d') an oxadiazolyl group of the formula



(e') a triazolyl group selected from



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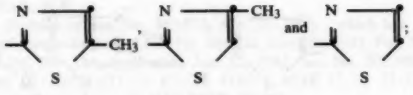
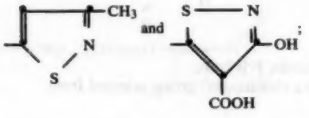
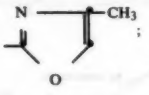
(f') a thiazolyl group selected from



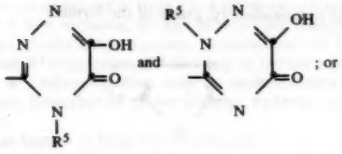
(g') an isothiazolyl group of the formula



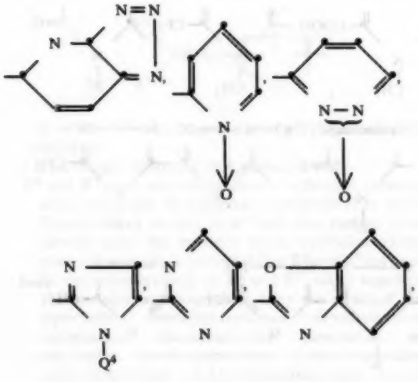
(h') an oxazolyl group of the formula



(i') a triazinyl group selected from



(j') a heteroaryl group selected from



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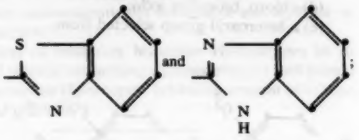


wherein Q^4 is hydrogen, C_1–C_4-alkyl, amino-C_2–C_4-alkyl, protected amino-C_2–C_4-alkyl or hydroxy-C_2–C_4-alkyl; or a salt of the formula 1 and 2 acids.

30. A method for treating infections in a mammal which comprises administering to said mammal a dose between about 50 mg/kg and about 500 mg/kg of a compound of claim **1** wherein R^1 is other than a carboxy-protecting group.

4,503,053

C-HOMO-9-OXA-ERGOLINES

Lucien Nedelec, Le Raincy; Jean-Claude Gasc, Bondy, and Patrick Fauveau, Livry-Gargan, all of France, assignors to Roussel Uclaf, Paris, France

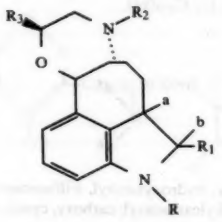
Filed Sep. 15, 1983, Ser. No. 532,740

Claims priority, application France, Sep. 20, 1982, 82 15773

Int. Cl.[3] **A61K** *31/535;* **C07D** *498/06*

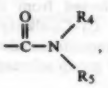
U.S. Cl. 514—239 **35 Claims**

1. A compound selected from the group consisting of C-homo-9-oxa-ergolines of the formula



I

wherein R is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, R_1 is selected from the group consisting of hydrogen, chlorine and bromine or taken with b forms=0, a and b form a carbon-carbon bond or a is hydrogen when R_1 and b form=0, R_2 is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms, aralkyl of 7 to 12 carbon atoms and cycloalkylalkyl of 4 to 7 carbon atoms, R_3 is selected from the group consisting of hydroxymethyl, alkylthiomethyl of 1 to 5 alkyl carbon atoms, cyanomethyl, carboxy optionally esterified with an aliphatic alcohol of 1 to 5 carbon atoms and



R_4 is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, R_5 is alkyl of 1 to 4 carbon atoms or R_4 and R_5 taken with the nitrogen atom form a saturated heterocycle optionally containing a second heteroatom.

8. An antihypertensive and dopaminergic agonist composition comprising an antihypertensively and dopaminergic agonistically effective amount of at least one compound of claim **1** and an inert carrier.

4,503,054
6-ARYL-1,2,4-TRIAZIN-6-ONES WHICH POSSESS CARDIOTONIC PROPERTIES

David Brown, Macclesfield; Robert I. Dowell, Congleton; Rodney B. Hargreaves, Poynton, and Brian G. Main, Sandbach, all of England, assignors to Imperial Chemical Industries PLC, London, England

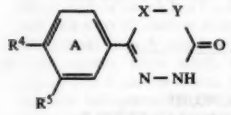
Division of Ser. No. 321,899, Nov. 16, 1981, Pat. No. 4,423,045. This application Aug. 31, 1983, Ser. No. 528,103

Claims priority, application United Kingdom, Nov. 14, 1980, 8036680

Int. Cl.³ C07D *253/06;* A61K *31/53*

U.S. Cl. 514—242 7 Claims

1. A heterocyclic compound of the formula:



where X is $—CR^1R^2—$ and Y is $—NR^3—$, wherein R^1, R^2 and R^3, which may be the same or different, each is hydrogen or alkyl of up to 4 carbon atoms;

wherein R^4 and R^5, which may be the same or different, each is hydrogen, cyano, nitro, amino, or hydroxy, or alkylthio of up to 4 carbon atoms, or has the formula:

$—Q—CZ—OR^6$ $—Q—SO_2—NR^7R^8$

$—Q—CZ—NR^7R^8$ $—Q—SO_2—R^9$

$—Q—CZ—R^9$ $—Q—SO—R^9$

where Q is a direct link, or is imino (—NH—), or is oxyalkylene of up to 4 carbon atoms, where Z is oxygen or sulphur and wherein R^6, R^7, R^8 and R^9, which may be the same or different, each is hydrogen, alkyl, alkenyl, cycloalkyl or alkoxyalkyl each of up to 6 carbon atoms, or aryl or arylalkyl each of up to 12 carbon atoms, or wherein R^7 and R^8 together with the adjacent nitrogen atom form a 5- or 6-membered fully-saturated heterocyclic ring, provided that R^4 and R^5 are not both hydrogen;

or wherein R^4 and R^5 are joined together such that with the benzene ring A they form a benz-heterocyclic ring wherein the heterocyclic part is a 5- or 6-membered ring containing one oxygen, sulphur or nitrogen atom, and which heterocyclic part may optionally contain an oxo substituent or an alkyl or alkanoyl substituent each of up to 6 carbon atoms;

and wherein the benzene ring A may optionally bear one or more chloro, bromo, methyl, ethyl, methoxy or ethoxy substituents;

or a salt thereof where appropriate.

7. A method for the treatment of acute or chronic heart failure in a warm-blooded animal in need of such treatment which comprises administering to said animal an effective amount of a heterocyclic compound claimed in claim 1.

4,503,055
DERIVATIVES OF [4-(PIPERAZIN-1-YL-PHENYLOXYMETHYL)-1,3-DIOXOLAN-2-YLMETHYL]-1H-IMIDAZOLES AND 1H-1,2,4-TRIAZOLES

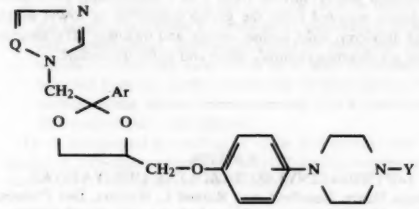
Jan Heeres, Vosselaar, and Joseph Mostmans, Antwerp, both of Belgium, assignors to Janssen Pharmaceutica, N.V., Beerse, Belgium

Continuation of Ser. No. 23,807, Mar. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 921,380, Jul. 3, 1978, abandoned. This application Sep. 28, 1981, Ser. No. 306,267

Int. Cl.³ A61K *31/415;* C07D *405/14*

U.S. Cl. 514—285 6 Claims

1. A chemical compound selected from the group consisting of a compound having the formula:



and the pharmaceutically acceptable acid addition salts and stereochemically isomeric forms thereof, wherein:

Q is a member selected from the group consisting of N and CH;

Ar is a member selected from the group consisting of phenyl, thienyl, halothienyl and substituted phenyl, said substituted phenyl having from 1 to 3 substituents each independently selected from the group consisting of halo, lower alkyl, lower alkyloxy and trifluoromethyl; and

the radical Y is a member selected from the group consisting of:

a radical of the formula

$—SO_2—R^1$ (a)

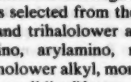
wherein R^1 is selected from the group consisting of trifluoromethyl and aryl;

a radical of formula

$—alk—R^2$ (b)

wherein alk is a member selected from the group consisting of lower alkylene and lower alkenylene and R^2 is a member selected from the group consisting of cyano, amino, mono- and di(aryllower alkyl)amino, 1-pyrrolidinyl, 1-morpholinyl, 1-piperidinyl, aryloxy and aryl, provided that alk is other than methylene when R^2 is phenyl;

a radical of formula

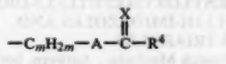
 (c)

wherein n is an integer of from 0 to 6 inclusive, X is O or S and R^3 is selected from the group consisting of hydrogen, mono-, di- and trihalolower alkyl, amino, mono- and di(lower alkyl)amino, arylamino, mono- and di(aryllower alkyl)amino, aminolower alkyl, mono- and di(lower alkyl)aminolower alkyl, (1-pyrrolidinyl)lower alkyl, (1-morpholinyl)lower alkyl, (1-piperidinyl)lower alkyl, aryl, aryllower alkyl, aryllower alkenyl and lower alkyloxycarbonyllower alkyloxy, provided that:

(i) said n is other than 0 or 1 when said R^3 is amino or lower alkylamino; and

(ii) said n is other than 0 when said R^3 is di(lower alkyl)amino or aryl or hydrogen; and

a radical of formula



(d)

wherein m is an integer of from 1 to 6 inclusive, A is O or NH, X is O or S and R^4 is a member selected from the group consisting of hydrogen, lower alkyl, lower alkyloxy, aryl, aryloxy, aryllower alkyl, amino, mono- and di(lower alkyl)amino, arylamino, mono- and di(aryllower alkyl)amino, 1-pyrrolidinyl, 1-morpholinyl and 1-piperidinyl;

wherein said aryl, as used in the foregoing definitions, is selected from the group consisting of phenyl, substituted phenyl, thienyl, halothienyl, lower alkylthienyl and pyridinyl, said substituted phenyl having from 1 to 3 substituents each independently selected from the group consisting of lower alkyl, lower alkyloxy, halo, amino, mono- and di(lower alkyl)amino, lower alkylcarbonylamino, nitro and trifluoromethyl.

4,503,056

1-(PYRIDAZINYL)PYRAZOLINE DERIVATIVES

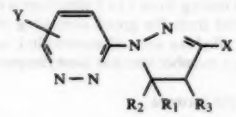
Fortuna Haviv, Deerfield, and Roland L. Walters, Des Plaines, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 2, 1982, Ser. No. 354,118

Int. Cl.[3] **C07D** *231/06, 237/06;* **A61K** *31/50*

U.S. Cl. 514—252 **18 Claims**

1. A compound of the formula



wherein R_1, R_2 and R_3 independently of one another denote hydrogen or loweralkyl, X is hydroxy or amino, and Y is

wherein W and Z independently of one another denote hydrogen, halo, loweralkyl, loweralkoxy, trifluoromethyl, acetamido, cyano, diloweralkylamino, phenoxy and loweralkylmercapto, and pharmaceutically acceptable salts thereof.

4,503,057

COMBATING PESTS WITH NOVEL SUBSTITUTED N,N-DIMETHYL O-PYRIMIDIN-4-YL CARBAMATES

Fritz Maurer, Wuppertal; Ingeborg Hammann, Muelheim; Bernhard Homeyer, Leverkusen, and Wilhelm Stendel, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

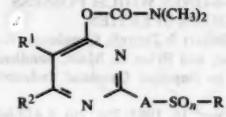
Filed Mar. 11, 1983, Ser. No. 474,402

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1982, 3211035

Int. Cl.[3] **C07D** *239/34;* **A01N** *47/18*

U.S. Cl. 514—269 **10 Claims**

1. A substituted N,N-dimethyl O-pyrimidin-4-ylcarbamate of the formula



in which

R is alkyl having 1 to 6 carbon atoms,

R^1 is hydrogen, or alkyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, each of which has 1 to 6 carbon atoms and is optionally substituted by halogen, C_{1-2}-alkoxy or C_{1-2}-alkylthio,

R^2 is hydrogen, or alkyl which has 1 to 6 carbon atoms and is optionally substituted by halogen, C_{1-2}-alkoxy or C_{1-2}-alkylthio, or

R^1 and R^2 together form alkylene which has 2 to 4 carbon atoms and is optionally substituted by halogen, C_{1-2}-alkyl or C_{1-2}-alkylthio, and alkylene having 2 to 6 atoms,

A is alkylene having 2 to 6 carbon atoms, and

n is 0, 1 or 2.

4,503,058

THERAPEUTICALLY USEFUL 3,7A-DIAZACYCLOHEPTA[j,k]FLUORENE DERIVATIVES

Jean Bertin, Clamart, and Jonathan R. Frost, Cachan, both of France, assignors to Synthelabo, Paris, France

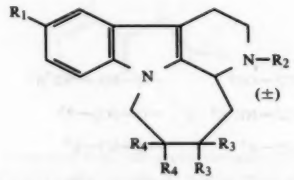
Filed Dec. 2, 1982, Ser. No. 446,368

Claims priority, application France, Dec. 3, 1981, 81 22643

Int. Cl.[3] **C07D** *471/16;* **A61K** *31/55*

U.S. Cl. 514—214 **6 Claims**

1. A compound of the formula:



wherein R_1 represents a hydrogen or chlorine atom or a methoxy radical, R_2 represents a hydrogen atom or the methyl or benzyl radical, and R_3 and R_4 represents hydrogen atoms, or R_3 represents the methyl radical and R_4 represents a hydrogen atom or R_3 represents a hydrogen atom and R_4 represents the methyl radical, and its pharmacologically-acceptable acid addition salts.

4,503,059

1,3-DIOXACYCLOPENTANES, THEIR PESTICIDAL USE AND COMPOSITIONS FOR PESTICIDAL USE

Wolfgang Krämer; Wolf Reiser; Dieter Berg, all of Wuppertal; Wilhelm Brandes, Leichlingen, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

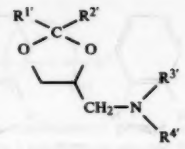
Filed May 20, 1983, Ser. No. 496,776

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1982, 3221138; Feb. 19, 1983, 3305769

Int. Cl.[3] **A01N** *431/00;* **C07D** *405/06*

U.S. Cl. 514—326 A **16 Claims**

8. A substituted aminoketal of the formula



in which

$R^{1'}$ represents a straight-chain or branched alkyl having 6 to 18 carbon atoms; straight-chain or branched branched halogenoalkyl having 2 to 12 carbon atoms and 1 to 5 halogen atoms, straight-chain or cyanoalkyl having 1 to 4 carbon atoms in the alkyl part, benzyl which is monosubstituted or polysubstituted by identical or different substituents, arylalkyl which has 2 to 6 carbon atoms in the alkyl part and 6 to 10 carbon atoms in the aryl part and is optionally monosubstituted or polysubstituted by identical or different substituents, and aryloxyalkyl, aralkyloxyalkyl, arylthioalkyl, arylsulphonylalkyl and arylsulphonylalkyl, each of which has 1 to 6 carbon atoms in each alkyl part and 6 to 10 carbon atoms in the aryl part, the aryl substituents in each case being:

halogen, cyano, nitro; alkyl, alkoxy and alkylthio, each having 1 to 4 carbon atoms, halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 or 2 carbon atoms and 1 to 5 halogen atoms, cycloalkyl having 5 to 7 carbon atoms, alkoxycarbonyl having 1 to 4 carbon atoms in the alkyl part, and phenoxy or phenyl which is optionally substituted by halogen,

or by alkyl having 1 to 4 carbon atoms; cycloalkylalkyl having 1 to 4 carbon atoms in the alkyl part and 3 to 7 carbon atoms in the cycloalkyl part which is optionally monosubstituted or polysubstituted by alkyl having 1 to 4 carbon atoms; and also represents straight-chain or branched alkenyl having 2 to 5 carbon atoms, straight-chain or branched alkinyl having 2 to 6 carbon atoms; cycloalkyl which has 3 to 7 carbon atoms and is monosubstituted or polysubstituted by identical or different alkyl radicals having 1 to 4 carbon atoms, and represents arylalkenyl having 2 to 6 carbon atoms in the alkenyl part and 6 to 10 carbon atoms in the aryl part, the aryl substituents in each case being:

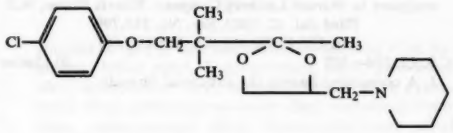
halogen, cyano, nitro; alkyl, alkoxy and alkylthio, each having 1 or 2 carbon atoms and 1 to 5 halogen atoms, cycloalkyl having 5 to 7 carbon atoms, alkoxycarbonyl having 1 to 4 carbon atoms in the alkyl part, phenoxy or phenyl which is optionally substituted by halogen, or by alkyl having 1 to 4 carbon atoms;

$R^{2'}$ represents hydrogen, straight-chain or branched alkyl having 1 to 18 carbon atoms, straight-chain or branched halogenoalkyl having 1 to 12 carbon atoms and 1 to 5 halogen atoms, straight-chain or branched cyanoalkyl having 1 to 4 carbon atoms in the alkyl part, arylalkyl, aryloxyalkyl, aralkyloxyalkyl, arylthioalkyl, arylsulphinylalkyl, and arylsulphonylalkyl, each of which has 1 to 6 carbon atoms in each alkyl part and 6 to 10 carbon atoms in the aryl part and is optionally monosubstituted or polysubstituted by identical or different substituents, the aryl substituents in each case being:

halogen, cyano, nitro; alkyl, alkoxy and alkylthio, each having 1 to 4 carbon atoms; halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 or 2 carbon atoms and 1 to 5 halogen atoms, cycloalkyl having 5 to 7 carbon atoms, alkoxycarbonyl having 1 to 4 carbon atoms in the alkyl part, and phenoxy or phenyl which is optionally substituted by halogen, in particular fluorine or chlorine, or by alkyl having 1 to 4 carbon atoms; and cycloalkylalkyl having 1 to 4 carbon atoms in the alkyl part and 3 to 7 carbon atoms in the cycloalkyl part which is optionally monosubstituted polysubstituted by alkyl having 1 to 4 carbon atoms, and also represents straight-chain or branched alkenyl or alkinyl, each having 2 to 6 carbon atoms, cycloalkyl which has 3 to 7 carbon atoms and is optionally monosubstituted or polysubstituted by identical or different alkyl radicals having 1 to 4 carbon atoms, or represents aryl having 6 to 10 carbon atoms and arylalkenyl having 2 to 6 carbon atoms in the alkenyl part and 6 to 10 carbon atoms in the aryl part, each of which is optionally monosubstituted or poly-substituted by identical or different substituents, the aryl substituents being: halogen, cyano, nitro; alkyl, alkoxy and alkylthio, each having 1 to 4 carbon atoms; halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 to 2 carbon atoms and 1 to 5 halogen atoms, cycloalkyl having 5 to 7 carbon atoms, alkoxycarbonyl having 1 to 4 carbon atoms in the alkyl part, and phenoxy or phenyl which is optionally substituted by halogen or by alkyl having 1 to 4 carbon atoms or by alkyl having 1 to 4 carbon atoms,

$R^{3'}$ and $R^{4'}$, together with the nitrogen atom to which they are bonded, represent a pyrrolidinyl, piperidinyl, piperazinyl, morpholinyl, perhydrozepinyl or pyrazolyl radical which is optionally substituted by at least one substituent selected from the group consisting of alkyl having 1 to 4 carbon atoms, alkoxycarbonyl having 1 to 4 carbon atoms in the alkyl part, and phenyl.

12. A compound according to claim **8** wherein such compound is 2-(4-chlorophenoxy-t-butyl)-2-methyl-4-(piperidin-1-ylmethyl)-1,3-dioxolane of the formula



or a physiologically tolerated addition product thereof with an acid or metal salt.

4,503,060

3-IMINO-3H-DIBENZO-[c,f]-IMIDAZO-[1,5-a]AZEPINE PHARMACEUTICALS

Gerhard Walther, Bingen; Claus Schneider, Ingelheim am Rhein; Karl-Heinz Weber, and Armin Fügner, both of Gau-Algesheim, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim KG, Ingelheim, Fed. Rep. of Germany

Filed Aug. 20, 1982, Ser. No. 410,006

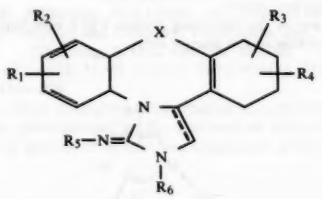
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1981, 3134672

The portion of the term of this patent subsequent to Feb. 2, 1999, has been disclaimed.

Int. Cl.[3] **A61K** *31/55*; **C07D** *487/04, 491/04, 495/04*

U.S. Cl. 514—214 **5 Claims**

1. A compound of the formula



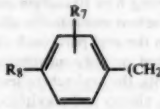
wherein

R_1, R_2, R_3 and R_4 are each hydrogen, halogen, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms;

R_5 is hydrogen, alkyl of 1 to 6 carbon atoms or alkenyl of 3 to 6 carbon atoms;

R_6 is alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon

atoms, phenyl, halo-phenyl, lower alkyl-phenyl, or lower alkoxy-phenyl or



R_7 and R_8 are each hydrogen, halogen, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms;

n is an integer from 0 to 4, inclusive;

X is —O—, —S— or —CH_2—; and the broken line between the 1- and 13b-positions indicates a single or double bond; or a non-toxic, pharmacologically acceptable acid addition salt thereof.

5. The method of suppressing allergic reactions or relieving thrombosis in a warm-blooded animal, which comprises perorally, parenterally, rectally or topically administering to said animal an effective antiallergic or antithrombotic amount of a compound of claim 1.

4,503,061

SUBSTITUTED PHENYL-PYRIDINONES AS CARDIOTONIC AGENTS

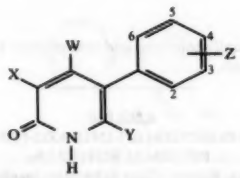
James A. Bristol, and Ila Sircar, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jul. 22, 1983, Ser. No. 515,799

Int. Cl.[3] **C07D** *401/02;* **A61K** *31/44*

U.S. Cl. 514—338 **20 Claims**

1. A compound having the structural formula



wherein

(A) X is

(1) H, CH_2OH, F, Cl, Br, CN,

(2) CO_2R_1 where R_1 is hydrogen, alkyl of from one to six carbon atoms, or a pharmaceutically acceptable metal or amine cation,

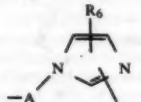
(3) $CONR_2R_3$ where R_2 and R_3 are independently hydrogen or alkyl of from one to six carbon atoms, or

(4) NR_4R_5 where R_4 and R_5 are independently hydrogen or alkyl of from one to six carbon atoms;

(B) W and Y are independently hydrogen or alkyl of from one to six carbon atoms;

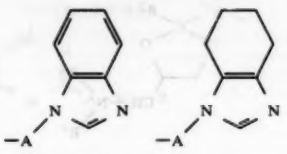
(C) Z is any of the following groups 1 to 6 attached to the 3- or 4-position of the phenyl ring

(1)



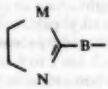
wherein A is a direct bond to the phenyl ring, $(CH_2)_n$ or $O(CH_2)_{n+1}$ (where n is 1 to 4), and R_6 and R_7 are independently hydrogen, alkyl of from one to six carbon atoms, or hydroxyalkyl of from one to six carbon atoms;

(2)



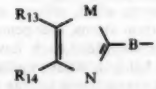
wherein A is as defined above;

(3)



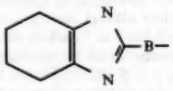
wherein B is a direct bond to the phenyl ring or NH, and M is NH, O, or S;

(4)



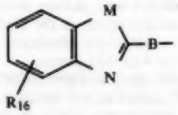
wherein B and M are as defined above, and R_{13} and R_{14} are independently hydrogen, alkyl or from one to six carbon atoms, $R_{15}CHOH$ where R_{15} is hydrogen or alkyl of from one to six carbon atoms;

(5)



wherein B and M are as defined above;

(6)



wherein B and M are as defined above, and R_{16} is hydrogen, hydroxy, alkyl of from one to six carbon atoms, alkoxy of from one to six carbon atoms, —SCH_3, —$S(O)CH_3$, or —$S(O_2)CH_3$;

or a pharmaceutically acceptable salt thereof.

4,503,062

AZOLYL:SUBSTITUTED ALICYCLIC ALCOHOLS

Michael B. Gravestock, Cheadle, England, assignor to Imperial Chemical Industries PLC, London, England

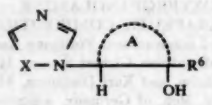
Filed Mar. 28, 1983, Ser. No. 479,914

Claims priority, application United Kingdom, Apr. 22, 1982, 8211705

Int. Cl.[3] **A01N** *43/50, 43/64;* **C07D** *233/60, 249/08*

U.S. Cl. 514—383 **10 Claims**

1. An alicyclic alcohol compound of the formula:



wherein R^6 is an unsubstituted phenyl radical or a phenyl radical bearing 1 to 5 substituents selected from halogen atoms, amino, nitro, cyano, phenyl and halogenophenyl radicals, and alkyl, halogenoalkyl, alkoxy, halogenoalkoxy, alkylthio, alkylenedioxy, alkylamino and dialkylamino radicals wherein each alkyl, alkoxy or alkylene part is of 1 to 10 carbon atoms, X is a nitrilo or methine radical, and the ring A is an indane, tetrahydronaphthalene or benzocycloheptane ring each of which is either unsubstituted or is substituted in the benzene ring thereof with 1 to 4 substituents as defined above.

7. A pharmaceutical or veterinary antifungal composition which comprises a fungicidally effective amount of a compound as claimed in claim 1 together with a pharmaceutically or veterinary acceptable diluent or carrier.

4,503,063

N-ACYL 3-ARYL-3-HYDROXY-4-(1H-1,2,4-TRIAZOL-1-yl)-BUTYRAMIDE ANTIFUNGAL AGENTS

Kenneth Richardson, Canterbury, and Kelvin Cooper, Ramsgate, both of England, assignors to Pfizer Inc., New York, N.Y.

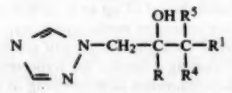
Filed Sep. 26, 1983, Ser. No. 535,971

Claims priority, application United Kingdom, May 7, 1983, 8312624

Int. Cl.[3] **A01N** *43/64;* **A61K** *31/41;* **C07D** *249/08, 401/06*

U.S. Cl. 514—383 **16 Claims**

1. Compounds of the formula



(I)

where R is phenyl optionally substituted by 1 to 3 substituents each independently selected from F, Cl, Br, I, CF_3, C_1–C_4 alkyl and C_1–C_4 alkoxy, or R is a 5-chloropyrid-2-yl group; R^1 is —$CONR^2R^3$ where either

(a) R^2 is H or C_1–C_4 alkyl and R^3 is C_2–C_4 alkanoyl or benzoyl, said benzoyl group being optionally substituted by one or two substituents each independently selected from F, Cl, Br, I, CF_3, C_1–C_4 alkyl and C_1–C_4alkoxy; or

(b) R^2 and R^3 are both (C_1–C_4 alkoxy)carbonyl;

R^4 and R^5 are each H or CH_3;

and their agriculturally or pharmaceutically acceptable acid addition salts.

15. A method of treating a fungal infection in an animal in need of such treatment which comprises administration to said animal an antifungal amount of a compound or pharmaceutically acceptable salt according to claim 1.

16. A method of treating a fungal infection in a plant or seed in need of such treatment which comprises administration to said plant or seed an antifungal amount of a compound or agriculturally acceptable salt according to claim 1.

4,503,064

OXIME SUBSTITUTED PENEMS

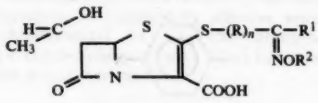
Viyyoor M. Girijavallabhan, Parsippany; Ashit K. Ganguly, Upper Montclair; Patrick A. Pinto, Mine Hill, and Richard W. Versace, Ringwood, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 445,295, Nov. 29, 1982,. This application Feb. 2, 1984, Ser. No. 576,499

Int. Cl.[3] **C07D** *499/00;* **A61K** *31/425*

U.S. Cl. 514—210 **17 Claims**

1. Compounds represented by the formula



and pharmaceutically acceptable salts and pharmaceutically acceptable esters thereof, in racemic or optically active forms, wherein

n is one or two;

R represents

wherein R^3 and R^4 are independently selected from hydrogen, lower alkyl, hydroxy-lower alkyl, halo-lower alkyl, amino-lower alkyl, carbamido-lower alkyl, cyano-lower alkyl, carbamoyloxy-lower alkyl, carbamoyl-lower alkyl, carboxy-lower alkyl, heterocyclyl-lower alkyl wherein the heterocyclic moiety has 5 or 6 ring atoms, at least one of which is carbon, and the remaining 4 or 5 ring atoms are independently selected from carbon, nitrogen, oxygen and sulfur; or R^3 and R^4 taken together are =O;

R^1 represents hydrogen, lower alkyl, hydroxy-lower alkyl, amino-lower alkyl, carboxy-lower alkyl, carbamoyloxy-lower alkyl, carbamoyl-lower alkyl, halo-loweralkyl, cyano-lower alkyl, heterocyclyl lower alkyl wherein the heterocyclic moiety has 5 or 6 ring atoms, at least one of which is carbon, and the remaining ring atoms are independently selected from oxygen, carbon, nitrogen and sulfur;

R^2 represents hydrogen, lower alkyl, carboxy-loweralkyl, hydroxy-lower alkyl, cyano-lower alkyl, amino-lower alkyl, imidazolyl-lower alkyl, triazolyl-lower alkyl, tetrazolyl-lower alkyl or pyridinium-lower alkyl.

4,503,065

ANTIINFLAMMATORY 4,5-DIARYL 1-2-HALO IMIDAZOLES

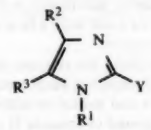
Wendell W. Wilkerson, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 3, 1982, Ser. No. 404,962

Int. Cl.[3] **A61K** *31/44, 31/415;* **C07D** *401/14, 233/54*

U.S. Cl. 514—396 **7 Claims**

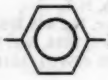
1. A method of treating inflammation in a mammal which comprises administering to the mammal an effective antiinflammatory amount of at least one compound of the formula:



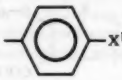
where

R^1 is H, methyl or 1-ethoxyethyl;

R^2 is pyridyl or



R^3 is pyridyl or



X and X^1 are independently F, Cl, Br, $—OR^4$ or $R^4S(O)_n—$;

R^4 is methyl or ethyl;

n is 0, 1 or 2; and

Y is F, Cl or Br;

provided that,

(a) when R^1 is methyl, then R^2 and R^3 are both 4-methoxyphenyl; and

(b) when R^1 is H, Y is Br and R^2 is 4-fluorophenyl, then R^3 is other than 4-methoxyphenyl; and

(c) when R^1 is H and R^2 and R^3 are 4-fluorophenyl, then Y is other than Cl;

or a pharmaceutically suitable acid addition salt thereof.

4,503,066

SPIRO-LINKED PYRROLIDINE-2,5-DIONES ACTIVE AS ENZYME ALDOSE REDUCTASE INHIBITORS

David R. Brittain, Macclesfield, and Robin Wood, Hazel Grove, both of England, assignors to Imperial Chemical Industries PLC, London, England

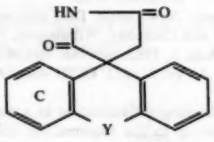
Filed May 11, 1982, Ser. No. 377,132

Claims priority, application United Kingdom, May 13, 1981, 8114625

Int. Cl.³ A61K *31/41*; C07D *491/107*

U.S. Cl. 514—409 **5 Claims**

1. A compound of the formula:



II

wherein benzene ring c optionally bears a fluoro, chloro, bromo, methyl or methoxy substituent in the 6'-, 7'- or 8'-position; and Y is oxygen; or a salt with a base affording a pharmaceutically acceptable cation.

5. A method of inhibiting the enzyme aldose reductase in a warm-blooded animal requiring such treatment, which comprises administering to said animal an aldose reductase inhibitory amount of a compound of formula II or of a pharmaceutically acceptable salt thereof, as claimed in claim 1.

4,503,067

CARBAZOLYL-(4)-OXYPROPANOLAMINE COMPOUNDS AND THERAPEUTIC COMPOSITIONS

Fritz Wiedemann, Weinheim-Lützelsachsen; Wolfgang Kampe, Heddesheim; Max Thiel, Mannheim; Gisbert Sponer, Hemsbach; Egon Roesch, Mannheim, and Karl Dietmann, Mannheim-Vogelstang, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany

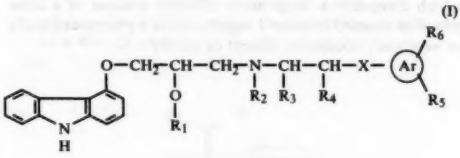
Continuation of Ser. No. 198,975, Oct. 21, 1980, abandoned, which is a continuation of Ser. No. 21,394, Mar. 16, 1979, abandoned. This application Apr. 4, 1983, Ser. No. 479,921

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1978, 2815926

Int. Cl.³ A61K *31/40*; C07D *401/12, 209/82*

U.S. Cl. 514—411 **18 Claims**

1. Carbazolyl-(4)-oxypropanolamine compound of the formula



(I)

wherein

R_1 is hydrogen, lower alkanoyl of up to 6 carbon atoms or aroyl selected from benzoyl and naphthoyl;

R_2 is hydrogen, lower alkyl of up to 6 carbon atoms or arylalkyl selected from benzyl, phenylethyl and phenylpropyl;

R_3 is hydrogen or lower alkyl of up to 6 carbon atoms;

R_4 is hydrogen or lower alkyl of up to 6 carbon atoms, or when X is oxygen, R_4 together with R_5 can represent $—CH_2—O—$;

X is a valency bond, $—CH_2$, oxygen or sulfur;

Ar is selected from phenyl, naphthyl, indanyl and tetrahydronaphthyl;

R_5 and R_6 are individually selected from hydrogen, fluorine, chlorine, bromine, hydroxyl, lower alkyl of up to 6 carbon atoms, a $—CONH_2—$ group, lower alkoxy of up to 6 carbon atoms, benzyloxy, lower alkylthio of up to 6 carbon atoms, lower alkylsulphinyl of up to 6 carbon atoms and lower alkylsulphonyl of up to 6 carbon atoms; or

R_5 and R_6 together represent methylenedioxy;

and the salts thereof with physiologically acceptable acids.

13. A method of treating a subject for hypertension and/or angina pectoris which comprises administering to such subject a therapeutically effective amount of a carbazolyl-(4)-oxypropanolamine compound as claimed in claim 1.

4,503,068

USE OF PROSTAGLANDIN ANALOGUES TO TREAT CYTODAMAGE

Yoshiki Sakai, Mishimagun; Katsuhiro Imaki, Tsuzukigun, and Takashi Muryobayashi, Takatsuki, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Filed May 23, 1983, Ser. No. 497,052

Claims priority, application Japan, May 25, 1982, 57-87230

Int. Cl.³ A61K *31/40, 31/34, 31/19*

U.S. Cl. 514—412 **17 Claims**

1. A method for the prevention or treatment of cytodamage associated with liver or pancreatic disease in a mammalian host which comprises administering to a host subject to, or suffering from, an aforesaid disease an effective amount of at least one prostaglandin analogue selected from the group consisting of

16S-methyl-6-oxo-PGE_1 methyl ester,

17S,20-dimethyl-6-oxo-PGE_1 methyl ester,

15S-methyl-6-oxo-PGE_1,
17S,20-dimethyl-13,14-dihydro-6-oxo-PGE_1 methyl ester,
17S,20-dimethyl-6-oxo-PGE_1 alcohol,
17S,20-dimethyl-6S-PGI_1 methyl ester,
17S,20-dimethyl-trans-Δ^2-6RS-PGI_1 methyl ester,
17S,20-dimethyl-6,9α-nitrilo-PGI_1 methyl ester,
2-decarboxy-2-glycoloyl-17S,20-dimethyl-6S-PGI_1,
2-decarboxy-2-glycoloyl-15-cyclopentyl-16,17,18,19,20-pentanor-6S-PGI_1
17S,20-dimethyl-6S-PGI_1 alcohol,
15-cyclopentyl-16,17,18,19,20-pentanor-6S-PGI_1 alcohol and
15-(3-propylcyclopentyl)-16,17,18,19,20-pentanor-6,9α-nitrilo-PGI_1 alcohol
or a cyclodextrin clathrate thereof, or a non-toxic salt of 15S-methyl-6-oxo-PGE_1.

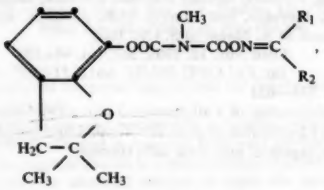
4,503,069

N-ALKYLIDENE-IMINO-OXYCARBONYL-N-METHYL-[2,2-DIMETHYL-2,3-DIHYDROBENZOFURANYL(7)]-CARBAMATES AND THEIR USE FOR CONTROLLING PESTS

Jozef Drabek, Oberwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 6, 1983, Ser. No. 492,110
Claims priority, application Switzerland, May 17, 1982, 3053/82; Feb. 18, 1983, 902/83
Int. Cl.³ A01N *47/24;* C07D *307/86*
U.S. Cl. 514—469 **9 Claims**

1. An N-alkylidene-imino-oxycarbonyl-N-methyl-[2,2-dimethyl-2,3-dihydrobenzofuranyl(7)]-carbonate of the formula



wherein R_1 and R_2 independently of one another are each a C_1–C_{10} alkyl group, or together they are a C_2–C_9 alkylene group.

8. A method of controlling insects and acarids which comprises applying thereto or to the locus thereof an effective amount of a compound according to claim 1.

4,503,070

METHOD FOR REDUCING THE DURATION OF THE COMMON COLD

George A. Eby, III, 2109 Paramount St., Austin, Tex. 78704

Continuation-in-part of Ser. No. 288,750, Jul. 31, 1981, abandoned. This application May 14, 1982, Ser. No. 378,479
Int. Cl.³ A61K *31/315*
U.S. Cl. 514—494 **3 Claims**

1. The method of administering an agent to reduce duration of common cold symptoms in humans, which includes reducing the duration of nasal drainage, nasal congestion, headache, fever, myalgia, sneeezing, sore throat, scratchy throat, cough, and horseness when such symptoms evince existence of a common cold, comprising:

applying, in the form of a lozenge, zinc gluconate to the oral mucosa of a human in need of treatment;

permitting zinc to remain in contact with the mucosa for a period of time necessary for lozenges to dissolve;

and applying additional dosages of zinc until the symptoms have disappeared.

4,503,071

INSECTICIDAL COMPOSITION CONTAINING OPTICALLY ACTIVE α-CYANO-3-PHENOXYBENZYL 2-(4-CHLOROPHENYL)ISOVALERATE

Masachika Hirano, Osaka; Isao Ohno, Hyogo; Nobuo Ohno, Osaka, and Akihiko Mine, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 17, 1977, Ser. No. 825,507
Claims priority, application Japan, Aug. 18, 1976, 51-99071
Int. Cl.³ A01N *53/00;* C07C *69/743*
U.S. Cl. 514—521 **13 Claims**

1. An insecticidal composition consisting essentially of, as an active ingredient, an insecticidally effective amount of α-cyano-3-phenoxybenzyl S-(+)-2-(4-chlorophenyl)isovalerate or S-(−)-α-cyano-3-phenoxybenzyl S-(+)-2-(4-chlorophenyl-)isovalerate and an inert carrier.

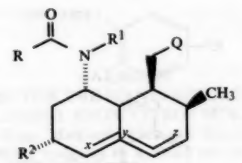
4,503,072

ANTIHYPERCHOLESTEROLEMIC COMPOUNDS

William F. Hoffman; Ta-Jyh Lee; Robert L. Smith, all of Lansdale, Pa., and Alvin K. Willard, Wilmington, Del., assignors to Merck & Co., Inc., Rahway, N.J.

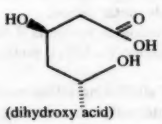
Division of Ser. No. 452,176, Dec. 22, 1982,. This application Jun. 18, 1984, Ser. No. 621,393
Int. Cl.³ A61K *31/195, 31/215;* C07C *103/365, 103/66, 103/731, 103/84*
U.S. Cl. 424—305 **9 Claims**

1. The compound of structural formula:



I

wherein
Q is:



(dihydroxy acid)

or a pharmaceutically acceptable salt, C_{1-3} alkyl ester or α-monoglyceride of the dihydroxy acid wherein
R^2 is hydrogen or methyl;
R is
(1) C_{1-10} alkyl, either straight or branched chain,
(2) C_{3-6} cycloalkyl,
(3) C_{2-10} alkenyl,
(4) halo-C_{1-10} alkyl,
(5) phenyl,
(6) phenyl substituted by one or more of halo, C_{1-3} alkyl, or C_{1-3} alkoxy,
(7) phenyl-C_{1-3} alkyl,
(8) phenyl-C_{1-3} alkyl wherein the phenyl group is substituted by one or more of halo, C_{1-3} alkyl, or C_{1-3} alkoxy;
R^1 is
(1) hydrogen,
(2) C_{1-3} alkyl,
(3) C_{3-6} cycloalkyl,
(4) C_{2-5} alkenyl,
(5) halo-C_{1-3} alkyl,
(6) benzyl, or

(7) benzyl, substituted by one or more of halo, C_{1-3} alkyl, or C_{1-3} alkoxy; and

the dotted lines X, Y and Z, represent possible double bonds, the double bonds, when any are present being either X and Z in combination or one of X, Y or Z alone.

7. A method of treating atherosclerosis, familial hypercholesterolemia or hyperlipemia comprising administering to a patient in need of such treatment an effective antihypercholesterolemic amount of the compound of claim 1, or a pharmaceutically acceptable salt, C_{1-3} alkyl or α-monoglyceride of the dihydroxy acid.

4,503,073

2-AMINO-3-(ALKYLTHIOBENZOYL)-PHENYLACETIC ACIDS

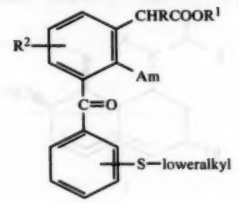
David A. Walsh, and Dwight A. Shamblee, both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 222,870, Jan. 7, 1981, abandoned, which is a continuation of Ser. No. 68,029, Aug. 1, 1979, abandoned. This application Nov. 22, 1983, Ser. No. 554,420

Int. Cl.³ C07C *149/43;* A61K *31/24, 31/195*

U.S. Cl. 514—539 **28 Claims**

1. A compound selected from the group having the formula:



wherein;

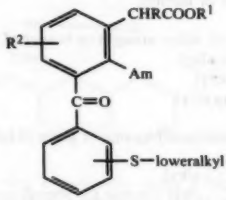
R is selected from hydrogen or lower alkyl,

R^1 is selected from hydrogen, loweralkyl, or pharmaceutically acceptable metal cation,

R^2 is hydrogen, halogen, loweralkyl or lower alkoxy,

Am is primary amino ($—NH_2$), methylamino or dimethylamino.

10. A method of alleviating inflammation in a living animal body comprising internally administering to said living animal body an effective amount of a compound selected from the group having the formula:



wherein;

R is selected from hydrogen or lower alkyl,

R^1 is selected from hydrogen, loweralkyl or pharmaceutically acceptable metal cation,

R^2 is hydrogen, halogen, loweralkyl or lower alkoxy,

Am is primary amino ($—NH_2$), methylamino or dimethylamino.

4,503,074

HALOGENATED GEMINAL DIESTERS

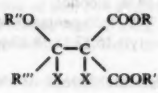
Arthur J. Friedman, Marlboro, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 8, 1983, Ser. No. 520,942

Int. Cl.³ A61K *31/225;* C07C *69/38*

U.S. Cl. 514—547 **5 Claims**

1. A halogenated geminal diester compound represented by the formula



wherein

R, R' and R'' are independently a lower alkyl group,

R''' is H or lower alkyl, and

X is chlorine or bromine.

4. A composition for the control of bacteria, fungi and yeast comprising an inert carrier and an anti-bacteria, fungi and yeast effective amount of a compound of claim 1.

4,503,075

DERIVATIVES OF 1-ALKYLAMINE-3[4(P-ALKYLOXY-BENZAMIDE)-PHENOXY]-2-PROPANOL, HAVING BETA-SYMPATHOLYTIC ACTIVITY, THEIR SALTS, AND PRODUCTION PROCESSES THEREOF

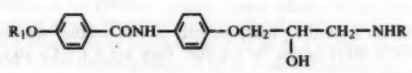
Vittorio Pestellini; Mario Ghelardoni, both of Florence; Danilo Giannotti, Altopascio; Alessandro Giolitti, Florence; Carlo A. Maggi, Florence; Stefano Manzini, Florence; Guglielmo Grimaldi, Florence, and Alberto Meli, Florence, all of Italy, assignors to A. Menarini S.A.S., Italy

Filed Nov. 12, 1982, Ser. No. 441,101

Int. Cl.³ C07C *103/82;* A61K *31/165*

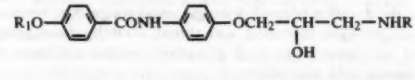
U.S. Cl. 514—622 **20 Claims**

1. A derivative of 1-alkylamine-3-[4(p-alkyloxybenzamide)-phenoxy]-2-propanol of general forumla I and the pharmaceutically acceptable, non-toxic salts thereof:



where R_1 is a linear or branched alkyl chain with 1 to 8 carbon atoms included, an alkenyl chain with 2 to 8 carbon atoms included, or an arylalkyl chain with 7 to 10 carbon atoms included, and R is a linear or branched alkyl group with 1 to 8 carbon atoms included.

17. Method of treating beta chronotropic effects induced by hyperactivity of the sympathetic nervous system in a subject for blocking such beta chronotropic effects, which comprises administering to such a subject an effective beta chronotropic-blocker amount of a compound selected from the group consisting of a derivative of 1-alkylamino-3-[4-(p-alkyloxybenzamido)phenoxy]-propan-2-ol of the formula



wherein R_1 is a linear or branched alkyl chain having 1 to 8 carbon atoms inclusive, an alkenyl chain having 2 to 8 carbon atoms inclusive, or an arylalkyl chain having 7 to 10 carbon atoms inclusive, and R is a linear or branched alkyl group having 1 to 8 carbon atoms inclusive, and the pharmaceutically acceptable non-toxic salts thereof.

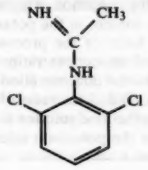
4,503,076

VASODILATOR COMPOUND AND PHARMACEUTICAL COMPOSITIONS THEREFROM

Leonardo De Vincentiis, Rome, Italy, assignor to Ausonia Farmaceutic s.r.l., Rome, Italy

Filed Sep. 27, 1982, Ser. No. 424,516
Claims priority, application Italy, Dec. 1, 1981, 25374 A/81
Int. Cl.³ A61K *31/155*; C07C *123/00*
U.S. Cl. 514—631 **7 Claims**

1. A compound selected from the group consisting of N-(2,6-dichlorophenyl)acetamidine of formula (I)



(I)

and its addition salts with pharmaceutically compatible inorganic or organic acids.

3. A pharmaceutical composition having vasodilator activity, for lowering the blood pressure in a living subject which contains a therapeutically effective amount per unit dosage form of N-(2,6-dichlorophenyl)acetamidine of formula (I) or an addition salt thereof with a pharmaceutically acceptable organic or inorganic acid and inert ingredients.

4,503,077

METHOD FOR PRESERVING FISHING BAIT

Truman V. Horton, Rte. 2, Box 234, Ruston, La. 71270

Filed Jan. 24, 1983, Ser. No. 460,146
Int. Cl.³ A23K *3/00*
U.S. Cl. 426—1 **3 Claims**

1. A method for preserving worms for fishing bait comprising the steps of:

(a) introducing said worms into a rotating screen whereby bedding material is removed from said worms;

(b) placing said worms in a heaped mass on a flat surface for about 5 to about 10 minutes to allow the natural movement of said worms to work bedding material to the top of the heap to complete the removal of the bedding material from said worms;

(c) precooling said worms;

(d) freezing said worms at a temperature at least as low as the eutectic temperature of said worms;

(e) condensing water vapour surrounding said worms;

(f) evacuating air and non-condensable vapors surrounding said worms; and

(g) slowly heating said worms to a temperature of about 20 degrees centigrade.

4,503,078

PROCESS FOR THE PRODUCTION OF VINEGAR WITH MORE THAN 12 GMS/100 ML ACETIC ACID

Heinrich Ebner, Linz, Austria, assignor to Heinrich Frings GmbH & Co. Kg, Bonn, Fed. Rep. of Germany

Filed Mar. 8, 1982, Ser. No. 355,923
Int. Cl.³ C12J *1/00*
U.S. Cl. 426—17 **1 Claim**

1. In a process for the production of vinegar with an acetic acid concentration of more than 12 g/100 ml by means of a single-stage submerged fermentation of alcohol-containing mashes in successive fermentation periods, in each of which a portion of the finished vinegar is extracted from the fermentation tank and replaced by a like quantity of fresh mash having an acetic acid concentration of up to 2 g/100 ml, an alcohol concentration of more than 10 vol.%, and a total concentration of more than 12.5%;

the improvement comprising the steps of:

(a) extracting from the tank, at the end of each of the successive fermentation periods and prior to the introduction of fresh mash into the tank, a quantity of finished vinegar, constituting between about 20% and less than 40% of the contents of the fermentation tank;

(b) introducing into the fermentation tank, after the extraction of said quantity of finished vinegar and to replace the same, a like quantity of fresh mash having acetic acid and alcohol concentrations which are so chosen that, at the start of each of the successive fermentation periods, by virtue of the commingling of the added fresh mash with the fermenting liquid remaining in the tank, the resultant acetic acid concentration of the augmented contents of the tank is more than 9 g/100 ml and less than 13 g/100 ml, and concomitantly the resultant alcohol concentration of the augmented contents of the tank is less than 4 vol.% and more than 2.5 vol.%; and

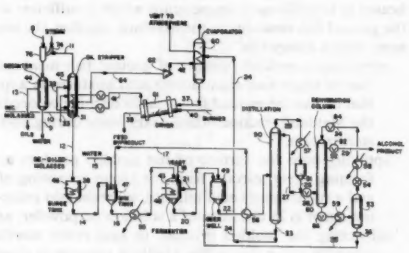
(c) conducting each of the successive fermentation periods at an aeration rate sufficient to provide a maximum hourly increase in acidity of about 0.17 g/100 ml to about 0.21 g/100 ml.

4,503,079

PROCESS FOR THE MANUFACTURE OF ETHYL ALCOHOL FROM CITRUS MOLASSES

Donald W. King, Maitland, Fla., and Terrance M. Placzek, Hallam, Nebr., assignors to A. Duda and Sons, Inc., Oviedo, Fla.

Filed Dec. 27, 1982, Ser. No. 453,736
Int. Cl.³ A23K *1/02*; C12P *7/12*
U.S. Cl. 426—54 **8 Claims**



3. A process for improving the yield of ethyl alcohol in the fermentation of citrus molasses, by removing certain inhibiting substances, including essential oils, that inhibit such fermentation, comprising the steps of stripping a substantial percentage of the fermentation inhibiting substances from the citrus molasses, by heating to a temperature of at least 240° F., conducting the stripped citrus molasses to a fermentation zone, adding water and at least a portion of recycled process liquor to produce a beer mixture, fermenting the beer mixture in the presence of yeast to produce a substantial yield of ethyl alcohol, passing the fermented, alcoholic mixture to a distillation zone, distilling and condensing the alcoholic component from the fermented mixture, resulting in a byproduct process liquor, and thereafter recycling a portion of the process liquor to a mix tank in the fermentation zone.

4,503,080

DOUGHS AND COOKIES PROVIDING STORAGE-STABLE TEXTURE VARIABILITY

William J. Brabbs, Cincinnati, and Charles A. Hong, Deerfield Township, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 396,525, Jul. 8, 1982, , and Ser. No. 240,051, Mar. 3, 1981, Pat. No. 4,455,333, which is a continuation-in-part of Ser. No. 220,643, Dec. 29, 1980, abandoned, which is a continuation-in-part of Ser. No. 107,229, Dec. 26, 1979, abandoned. This application Feb. 16, 1983, Ser. No. 466,822

The portion of the term of this patent subsequent to Jun. 19, 2001, has been disclaimed.

Int. Cl.[3] A21D *13/08*

U.S. Cl. 426—94 35 Claims

1. A sweetened food product in the form of a cookie dough preform, which, when baked, provides a storage-stable plurality of textures, comprising a crumb-continuous matrix made from cookie ingredients, and characterized in having distributed therein discrete regions of dough containing readily crystallizable sugar, and discrete regions of dough containing readily crystallizable sugar and a sugar crystallization inhibitor for the readily crystallizable sugar, whereby the product, when baked, provides a storage-stable plurality of textures, the regions containing crystallization inhibitor providing a chewy texture, and the regions not containing crystallization inhibitor providing a crisp texture.

4,503,081

METHOD FOR PRODUCING SURFACE-COLORED FISH-PASTE PRODUCTS AND PRODUCTS THUS PRODUCED

Mitsugi Ikoma, Kawagoe; Takeo Shinada, and Hisashi Nozaki, both of Sayama, all of Japan, assignors to Kabushiki Kaisha Kibun, Tokyo, Japan

Filed Jul. 19, 1982, Ser. No. 399,745

Claims priority, application Japan, Nov. 9, 1981, 56-179199

Int. Cl.[3] A23L *1/27, 1/325*

U.S. Cl. 426—268 16 Claims

1. In a method of production of a fish-paste product wherein a molded product of ground fish meat is subjected to retort sterilization during which the core of the molded product is heated at a sterilization temperature which is sufficient to color the ground fish meat due to the Maillard reaction, the improvement which comprises:

preparing a molded product of ground fish meat which is free of sugar and sugar-amino acid mixtures in a quantity that causes the ground fish meat to become colored due to the Maillard reaction which takes place during said retort sterilization;

applying onto the surface of the molded product a color-forming agent selected from the group consisting of sugar and a sugar-amino acid mixture, wherein said color-forming agent is in the form of a solution or powder; and

subjecting the molded product to said retort sterilization whereby color due to the Maillard reaction is developed on the surface of the molded product as a result of the sugar or sugar-amino acid mixture which has been applied on said surface, without substantially coloring the core of the molded product.

4,503,082

METHOD FOR REDUCING SODIUM CONTENT AND SIMULTANEOUSLY INCREASING POTASSIUM CONTENT OF A FOOD

Wayne M. Camirand, Albany, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 16, 1983, Ser. No. 475,784

Int. Cl.[3] A23L *1/238;* A23C *9/146;* C12N *1/04*

U.S. Cl. 426—271 7 Claims

1. A method for reducing the content of sodium in a sodium-containing food and simultaneously increasing the content of potassium in the food using Donnan dialysis, comprising:

simultaneously circulating an aqueous solution of the food wherein at least a portion of the sodium is ionized and a solution containing potassium ions on opposite sides of a cation exchange membrane at concentrations and for a time and at a rate sufficient to allow at least a portion of the sodium ions from the food solution to pass through the membrane to the potassium solution and to allow at least a portion of the potassium ions in potassium solution to pass to the food solution thereby resulting in the reduction of sodium content and increase in potassium content in the food solution and the reduction of potassium content and increase in sodium content in the potassium solution,

wherein the driving force of the process is the inequality between the ratio of the concentration of sodium ions in the food solution to the concentration of sodium ions in the potassium solution and the ratio of the concentration of potassium ions in the food solution to the concentration of potassium ions in the potassium solution.

4,503,083

HIGH QUALITY, REDUCED-CALORIE CAKE

Martin Glicksman, Valley Cottage; John R. Frost, Beacon, both of N.Y.; Jerry E. Silverman, Hamilton Square, N.J., and Elizabeth Hegedus, Tarrytown, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 8, 1982, Ser. No. 355,405

Int. Cl.[3] A21D *13/08*

U.S. Cl. 426—553 5 Claims

1. A cake comprising: 40–65% water, 5–30% cake flour, 0–25% sugar, 1–6% shortening, 0–10% egg white solids, 0.5–6% leavening agent, 0–2% emulsifier, 1–10% of a bulking agent selected from the group consisting of citrus albedo, sugar pulp, pineapple core, and combinations thereof, 0–10% gum, and less than 2.0 calories per gram.

4,503,084

NON-HEATED GELLAN GUM GELS

John K. Baird, and Jaewon L. Shim, both of San Diego, Calif., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 31, 1983, Ser. No. 499,594

Int. Cl.[3] A23L *1/04*

U.S. Cl. 426—573 9 Claims

1. A process of forming a gel of native gellan gum, deacetylated gellan gum, clarified deacetylated gellan gum, partially deacetylated gellan gum, or partially deacetylated, clarified gellan gum which comprises:

(a) dissolving 0.05–3% (wt./wt.) of gellan gum in an aqueous solution at 0°–70° C., and

(b) gelling the dissolved gellan gum with an effective amount of free cations selected from H+, Li+, Na+ K+, Rb+, Cs+, Fr+, Be++, Mg++, Ca++, Sr++, Ba++, Ra++, B+++, Al+++, Ga+++, In+++, or Tl+++ at 0°–70° C.

4,503,085

AMORPHOUS METAL POWDER FOR COATING SUBSTRATES

James Dickson, Stirling; Louis F. Nienart, Bloomsbury, and David W. Roth, Convent Station, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 285,730, Jul. 22, 1981, abandoned. This application Feb. 7, 1983, Ser. No. 464,180

Int. Cl.[3] B05D *1/10;* B22F *9/06;* C22C *19/08, 33/02*

U.S. Cl. 427—34 7 Claims

1. An amorphous metal powder for deposit onto a substrate consisting essentially of the formulation:

$$(Fe,Ni,Co)_{60}Cr_{0-20}(Mo,W,Mn)_{0-35}(B,Si,C)_{5-25}(Al,Ti)_{0-10}$$

where the subscripts are in atomic percent and with the provisos that the B content is between 4 and 15 atomic percent, the Cr content is between 5 and 10 atomic percent, the Si content is at least 5 atomic percent and bal exceeds 50%,

said powder being in fragmentized-ribbon platelet form and having a mesh size of −170 Tyler mesh.

4. A method for hardfacing a metal surface comprising the steps of:

selecting a fragmentized-ribbon platelet form of powder having a mesh size of −80 Tyler mesh and consisting essentially of the formulation:

$$(Fe,Ni,Co)_{bal}Cr_{-20}(Mo,W,Mn)_{0-35}(B,Si,C)_{5-25}(Al,-Ti)_{0-10}$$

where the subscripts are in atomic percent and with the provisos that the B content is between 4 and 15 atomic percent and that bal exceeds 50%;

passing said powder through a flame spray torch or an arc plasma torch;

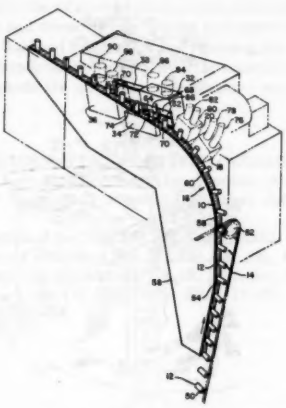
and depositing said powder onto a metal substrate.

4,503,086

DEVICE AND METHOD FOR UNIFORMLY CURING UV PHOTOREACTIVE OVERVARNISH LAYERS

Robert H. Schultz, Broomfield, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Aug. 22, 1983, Ser. No. 525,059
Int. Cl.³ B05D 3/06
U.S. Cl. 427—54.1 **23 Claims**



1. An apparatus for uniformly and completely curing uv photoreactive coatings on can bodies comprising:

vacuum belt means for non-rotatably holding said can bodies by external bottom portions and transporting said can bodies along a curved path having a curvature which exposes face portions and inside portions of said can bodies to radiation emitted from a predetermined location which impinges upon said face portions and said inside portions of said can bodies at an angle of incidence sufficient to completely cure said uv photoreactive coating on said face portions and said inside portions, said face portion being substantially aligned with the direction of travel of said can bodies;

first irradiator means disposed at said predetermined location for producing uv radiation to cure said uv photoreactive coatings on said face portions and inside portions of said can bodies;

second irradiator means for irradiating side portions of said can bodies with uv radiation to completely cure uv photoreactive coatings on said side portions and achieve complete and uniform curing of uv photoreactive coatings on said can bodies;

whereby the axis of said can bodies is substantially parallel to the plane of said curved path.

19. A method of uniformly curing uv photoreactive coatings on can bodies comprising the steps of:

non-rotatably holding said can bodies by external bottom portions on a vacuum belt;

transporting said can bodies on said vacuum belt along a predetermined path having a predetermined portion which changes direction along an arcuate path by a predetermined angle;

exposing said can bodies to uv radiation from at least one uv irradiation source aligned radially outward from said arcuate path to cure said uv photoreactive coatings on face portions and inside portions of said can bodies, said face portions being substantially aligned with the direction of travel of said can bodies;

exposing said can bodies to uv radiation from at least one uv irradiation source disposed along side portions of said predeterminerd path to cure said uv photoreactive coatings on side portions of said can bodies;

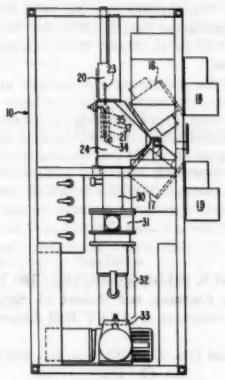
whereby the axis of said can bodies is substantially parallel to the plane of said predetermined path.

4,503,087

PROCESS FOR HIGH TEMPERATURE DRIVE-IN DIFFUSION OF DOPANTS INTO SEMICONDUCTOR WAFERS

Carl J. Russo, Ipswich, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Aug. 29, 1983, Ser. No. 527,140
Int. Cl.³ B05D 3/06
U.S. Cl. 427—55 **9 Claims**



1. A process for high temperature drive-in diffusion of dopants deposited on or near the surface of a semiconductor wafer, comprising:

providing a radiation source having a relatively uniform planar energy flux characteristic; and

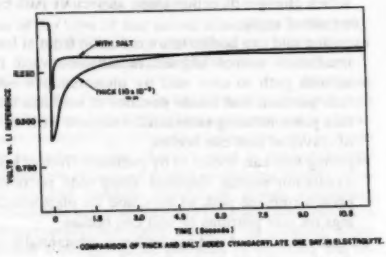
directing an intense beam of radiation from said source to said wafer and said dopants at a power level sufficient to heat said wafer and said dopants uniformly through the thickness of said wafer to a temperature beteen 1000° C. and 1350° C. said temperature being below the temperature which produces melting of said wafer and said dopants for a time selected to produce a prescribed amount of dopant diffusion.

4,503,088

TREATMENT OF LITHIUM ANODES

Niles A. Fleischer, Madison, Wis., assignor to Rayovac Corporation, Madison, Wis.

Continuation-in-part of Ser. No. 343,490, Jan. 28, 1982, Pat. No. 4,402,995. This application Jun. 22, 1983, Ser. No. 506,633
The portion of the term of this patent subsequent to Sep. 6, 2000, has been disclaimed.
Int. Cl.[3] B05D *5/12*; H01M *4/36*
U.S. Cl. 427—58 7 Claims



1. A method for reducing passivation of a lithium electrode used in a cell having a thionyl chloride liquid cathode comprising providing on the surface of said lithium electrode a polymer film selected from the group of alkyl acrylate and alkyl substituted acrylate polymers, said polymer film containing a salt in the polymer matrix.

4,503,089

METHOD FOR PRODUCING SEMICONDUCTOR DEVICES

Joseph M. Hunt, Natrona Heights, Pa., assignor to Allegheny Ludlum Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 431,506, Sep. 30, 1982, Pat. No. 4,450,208. This application Feb. 2, 1984, Ser. No. 576,234
Int. Cl.[3] H01L *21/48, 49/02*; H05K *3/36*
U.S. Cl. 427—86 4 Claims

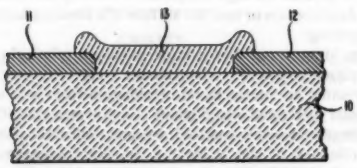
1. A method for producing a composite article comprising providing an irregular surface of a first layer of stainless steel metal with a second layer consisting essentially of a phosphate, silicate or a combination thereof, applied by reverse roller coating, dipping or spraying said second layer having a thickness sufficient to provide a smooth surface over said irregular surface the thickness of 0.000001 to 0.0001 inch, and coating a third layer of a semiconductor material on said smooth surface.

4,503,090

THICK FILM RESISTOR CIRCUITS

John F. Brown, Emmaus, and Robert M. Stanton, Allentown, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 23, 1983, Ser. No. 468,955
Int. Cl.[3] H01C *17/06*
U.S. Cl. 427—96 9 Claims



1. A method of fabricating a thick film resistor circuit on a substrate comprising the steps of:

depositing on the substrate a fritless paste comprising a metal component where the metal component comprises primarily copper and further includes 1–25 percent by weight of silver;

heating the structure at a temperature of less than 1100 degrees C in an oxidizing atmosphere to bond the metal component to said substrate;

forming a resistor material on said substrate and on portions of said metal;

heating the resulting structure in an oxidizing atmosphere to establish a desired sheet resistance for the resistor material; and

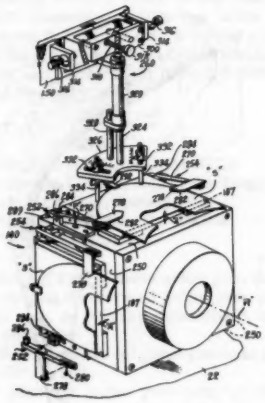
heating the structure in a reducing atmosphere to establish a desired sheet resistance for the metal without significantly affecting the resistor material.

4,503,091

SUBSTRATE ALIGNMENT AND LOADING METHOD FOR A POWDER REINFORCING MACHINE

Richard M. Elliott; Larry L. Holland, both of Beverly; Andrew J. Gilbride, Swampscott; Thomas J. Gilligan, III, Danvers; Lawrence P. Ciccia, Medford, and John F. Martin, Essex, all of Mass., assignors to USM Corporation, Farmington, Conn.

Filed Dec. 5, 1983, Ser. No. 558,057
Int. Cl.[3] B05C *13/00, 13/02*
U.S. Cl. 427—180 7 Claims



1. A method of loading a flexible substrate on a movable base on a rotatable transport mechanism of a powder deposition machine, comprising the steps of:

adjusting a guide pin support arrangement with respect to its distance from the frame of the machine by threadable articulation of a member therebetween;

adjusting said guide pin support arrangement side to side with respect to the axis of rotation of the rotatable transport mechanism by threadable articulation at least one member between said frame and said support arrangement;

locating an arrangement of guide pins on said guide pin support arrangement to provide proper alignment for a substrate to be guided thereby; and

pivoting a gripper mechanism off each side of the movable base so to provide space to insert a substrate up to the pre-arranged guide pins and onto the base which grippers prevent dislodging of said substrate during subsequent base rotation.

4,503,092

PROCESS FOR THE HYDROPHOBIZATION OF PYROGENICALLY PRODUCED SILICA

Hans Klebe, Rheinfelden; Detlev Koth, Grenzach-Whylen; Dieter Kerner, Hanau; Josef Schmid, Rheinfelden, and Manfred Schmid, Kandern, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 23, 1983, Ser. No. 477,875

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1982, 3211431

Int. Cl.³ C01B *33/18*

U.S. Cl. 427—213 10 Claims

1. In a process for the hydrophobization by means of an organohalosilane, steam and inert gas in a fluidized bed reactor of a pyrogenically produced silica made from a silicon halide compound in a burner wherein the silica, hydrogen halide and waste gases produced in said pyrogenic production are cooled in a cooling zone and the hydrogen halide separated therefrom, the improvement comprising directly after the separation of the hydrogen halide formed in the pyrogenic production of the silica, adding an inert gas to the silica and entrained waste gases separating the silica from the entrained waste gases, leading the separated gases into said cooling zone, mixing the silica freed from said waste gases first with a gaseous mixture consisting of said organohalosilane and an inert gas, introducing the mixture of silica and said gaseous mixture into the fluidized bed reactor and introducing a mixture of steam and inert gas separately from said mixture of silica, organohalosilane and inert gas, into the fluidized bed reactor and mixing the mixture of steam and inert gas with the mixture of silica, organohalosilane and inert gas therein and then carrying out the hydrophobization reaction in the fluidized bed reactor and returning the waste gases of the hydrophobization reaction to the separatory apparatus used to separate the silica from the entrained waste gases.

4,503,093

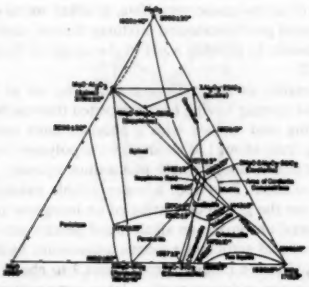
THERMALLY SPRAYABLE CERAMICS

Robert W. Iseli, 1919 Beechwood Dr., Florence, Ala. 35630, and Herbert Herman, 11 Meroke Trail, Port Jefferson, N.Y. 11777

Continuation of Ser. No. 409,709, Dec. 8, 1982, abandoned, which is a division of Ser. No. 294,250, Aug. 19, 1981, abandoned. This application Nov. 18, 1983, Ser. No. 553,384

Int. Cl.³ B05D *1/08;* C23C *13/00*

U.S. Cl. 427—248.1 13 Claims



1. A method of protecting a component which has a metal substrate against thermomechanical damage and/or vibration, said method comprising the step of applying and bonding to said metal substrate by thermal spraying a triple oxide coating precursor which consists essentially of a fully fused, thermally sprayable cordierite and which is capable of releasing sufficient exothermic energy when heated by thermal spraying as aforesaid to promote the adhesiveness of the coating to the substrate.

2. A method as defined in claim 1 wherein said triple oxide coating precursor is applied by combustion gun flame spraying.

4,503,094

PROCESS FOR PRODUCING SCRATCH RESISTANT ANTISTATIC SOUND AND PICTURE CARRIER

Axel Breuninger, Lorch; Richard Pollmann, and Peter Scheyrer, both of Schwabisch Gmund, all of Fed. Rep. of Germany, assignors to GFO Gesellschaft Fer Oberflachentechnik mbH, Gmund, Fed. Rep. of Germany

Division of Ser. No. 349,824, Feb. 18, 1982, Pat. No. 4,444,849. This application Oct. 11, 1983, Ser. No. 540,851

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1981, 3106573; Feb. 21, 1981, 3106544

Int. Cl.³ H04N *1/28;* B32B *3/02*

U.S. Cl. 427—250 23 Claims

1. A process for preparing a scratch resistant, antistatic sound or picture carrier comprising applying in a high vacuum to the surfaces of a synthetic resin layer (1) outer layers consisting of an iron-chromium-nickel alloy containing 10 to 25 weight % chromium, 5 to 20 weight % nickel, balance iron, or (2) applying thereto intermediate layers consisting essentially of either (a) an iron-chromium-nickel alloy consisting of 10 to 25 weight % chromium, 5 to 20 weight % nickel, balance iron or (b) an iron-chromium alloy and then without breaking the vacuum applying to the surfaces of the intermediate layer outer layers consisting essentially of a noble metal or a noble metal alloy, the outer layers in each of (1) or (2) having a thickness of 0.2 to 0.6μ.

4,503,095

HEAT-SENSITIVE COLOR TRANSFER RECORDING MEDIA

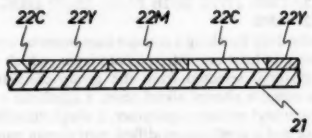
Tadao Seto, Matsudo, and Yoshikazu Shimazaki, Osaka, both of Japan, assignors to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan

Filed Feb. 8, 1983, Ser. No. 465,017

Claims priority, application Japan, Feb. 13, 1982, 57-21571; Feb. 13, 1982, 57-21572

Int. Cl.³ B41M *5/26*

U.S. Cl. 427—265 10 Claims



1. A heat-sensitive color transfer recording media comprising a continuous foundation and a multiplicity of coated areas of heat-sensitive transfer inks applied onto the foundation; the multiplicity of the coated areas being disposed on the continuous foundation side by side so as to traverse the continuous foundation; the multiplicity of the coated areas being arranged sequentially in the longitudinal direction of the continuous foundation in a repeating unit which comprises a plurality of

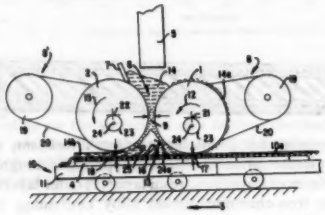
different color coated areas; each of the different color coated areas included in the repeating unit having a length in the longitudinal direction of the continuous foundation substantially equal to the length or width of a copy sheet; each of the heat-sensitive transfer ink layers of the coated areas being a transparent ink layer comprising a transparent coloring agent and a transparent hot-melt vehicle; and said plurality of the different color heat-sensitive transfer ink layers of the coated areas of the recording media being transferred onto the copy sheet so that different color ink images are superimposed on the copy sheet to give a color image.

4,503,096

METHOD AND DEVICE FOR THE CONTINUOUS APPLICATION OF A REINFORCEMENT LAYER ONTO A POROUS MINERAL BUILDING BOARD

Manfred Specht, Groebenzell, Fed. Rep. of Germany, assignor to Ytong AG, Munich, Fed. Rep. of Germany

Filed Sep. 8, 1983, Ser. No. 530,464
Int. Cl.³ B05D *1/28, 3/12;* **B05C** *1/06, 11/02*
U.S. Cl. 427—359 **13 Claims**



1. A method for the continuous application of a layering mass comprising a mineral fresh mortar on boards with a device which comprises a rotating application roller and a rotating smoothing roller positioned directly behind the application roller in the direction of transport of the said rotating application roller and said rotating smoothing roller being located above said boards, comprising spacing said application roller and said smoothing roller so as to form a lower gusset between the rollers, feeding said layering mass into the area of the lower gusset while rotating the application roller counter to the direction of transport of the boards to apply said layering mass to said boards and rotating the smoothing layer counter to the direction of transport of the boards to smooth the applied layering mass.

4,503,097

PAINT-FINISHING COMPOSITION FOR A CEMENT BASE MATERIAL

Hiromichi Higaki, and Nobuyuki Miyazaki, both of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Jun. 22, 1983, Ser. No. 506,618
Claims priority, application Japan, Jun. 28, 1982, 57-109829
Int. Cl.³ C08L *27/12;* **B32B** *27/00, 15/00;* **D02G** *3/00*
U.S. Cl. 427—386 **7 Claims**

1. A method for finishing a cement base material comprising:

(a) forming at least one intermediate layer, which is formed of a material selected from the group consisting of an epoxy resin, a phenol alkyd resin, a synthetic rubber, an ethylenevinyl acetate copolymer, a vinyl chloride copolymer sol and a urethane-modified epoxy resin paint, on the cement base in the form of a polymeric resin or paint; said layer having an outer surface; and

(b) forming a cured paint layer of a composition comprising: 100 parts by weight of a solvent-soluble fluorinated polymer containing cure sites selected from the group consisting of hydroxyl groups, epoxy groups, carboxyl groups, acid amide groups, ester groups, unsaturated bonds, active hydrogen atoms and halogen atoms, and an intrinsic viscosity of from 0.05 to 2.0 dl/g as measured at 30° C. in tetrahydrofuran;

from 0.1 to 100 parts by weight of a curing agent, and from 5 to 500 parts by weight of a coloring agent; said composition dissolved or dispersed in a solvent.

4,503,098

DISPOSABLE ARTICLES COATED WITH DEGRADABLE WATER INSOLUBLE POLYMERS

James E. Potts, Bernards Township, Morris County, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 186,429, Sep. 12, 1980, Pat. No. 4,372,311.
This application Aug. 5, 1982, Ser. No. 405,419
Int. Cl.³ A61L *15/00;* **A61F** *13/16;* **B32B** *23/08*
U.S. Cl. 427—394 **9 Claims**

1. A process for producing a degradable article or substrate by coating a disposable article or substrate made from a water-soluble polymer selected from one or more of a poly(alkylene oxide), hydroxyethyl cellulose, hydroxypropyl cellulose, polyvinyl alcohol, polyvinyl pyrrolidone, polyacrylamide, polyacrylic acid, or poly(vinyl methyl ether-co maleic anhydride): with a degradable water-insoluble polymer selected from one or more of a cyclic ester polymer, a poly(β-hydroxy butyrate), a dialkanoyl polymer, or an ethylene polymer: which comprises forming a solution by dissolving the water-insoluble polymer in a solvent and then applying the solution containing from about 0.5 to about 10 wt. % of the polymer in the solvent to at least one surface of the article or substrate so as to form a coating thereon of from 0.05 to about 5 mils in thickness.

4,503,099

HEAT TRANSFER SURFACES HAVING SCALE RESISTANT POLYMER COATINGS THEREON

Franklin S. Chang, and James A. Towers, both of Mt. Prospect, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Jun. 15, 1983, Ser. No. 504,564
Int. Cl.³ B32B *17/06;* **C23C** *1/10*
U.S. Cl. 428—425.8 **7 Claims**

1. A process for coating a surface of a metallic substrate comprising contacting at least one surface of said substrate with a polymer latex composition comprising from about 1 to about 10 wt% polymer latex solids, from about 0.05 to about 2 wt% of a sodium cyanide and from about 0.1 to about 3 wt% of a water-soluble oxidizing agent selected from the group consisting of an inorganic persulfate, an alkali metal chromate, an alkali metal perchlorate and mixtures thereof, and sufficient aqueous caustic to provide a pH in the range of from about 7 to about 12.

4. A metallic substrate having a coating on at least one surface, said coating having been deposited thereon by the step of contacting said surface with a polymer latex composition comprising from about 1 to about 10 wt% polymer latex solids, from about 0.05 to about 2 wt% of a sodium cyanide, and from about 0.1 to about 3 wt% of a water-soluble oxidizing agent selected from the group consisting of an inorganic persulfate, an alkali metal chromate, an alkali metal perchlorate and mixtures thereof and sufficient aqueous ammonium hydroxide to provide a pH in the range of from about 7 to about 12.

5. An aqueous polymer coating latex composition adapted for coating metallic substrates comprising from about 1 to about 10 wt% of polymer latex solids, from about 0.05 to about 2 wt% of a sodium cyanide and from about 0.1 to about 3 wt% of a water soluble oxidizing agent selected from the group consisting of an inorganic persulfate, an alkali metal chromate, an alkali metal perchlorate and mixtures thereof and sufficient aqueous ammonium hydroxide to provide a pH in the range of from about 7 to about 12.

4,503,100
MOTHPROOFING AND BEETLEPROOFING AGENT FOR KERATINOUS MATERIAL AND PROCESS

Bernardo de Sousa; Werner Schmid, both of Riehen, and Klaus Artz, Muttenz, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

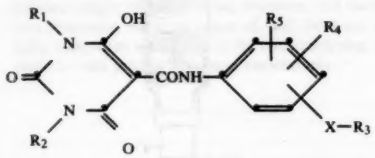
Filed Aug. 15, 1983, Ser. No. 523,485

Claims priority, application Switzerland, Aug. 26, 1982, 5081/82

Int. Cl.³ A23F *3/34*

U.S. Cl. 427—428 **21 Claims**

1. A composition for protecting keratin material against attack by keratin pests, which contains (A) one or more 5-phenylcarbamoylbarbiturate(s) of the formula



(1)

or tautomeric forms or salts thereof, in which R_1 and R_2 independently of one another are C_1–C_4-alkyl, C_3–C_6-cycloalkyl, C_2–C_4-alkenyl, benzyl, phenyl or phenyl which is substituted by 1 to 3 substituents belonging to the group comprising halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy and nitro, R_3 is C_1–C_4-halogenoalkyl, phenyl or phenyl which is substituted by 1–3 substituents belonging to the group comprising C_1–C_4-halogenoalkyl, nitro, halogen and C_1–C_4-alkyl, R_4 and R_5 independently of one another are hydrogen, halogen, C_1–C_4-halogenoalkyl, C_1–C_4-alkyl, C_2–C_4-alkenyl, C_3–C_6 cycloalkyl, methoxy or nitro and X is oxygen or sulfur, it being also possible for X—R_3, together with R_4 or R_5 in the ortho-position, to be the group —O—CF_2—O—CF_2—, and (B) one or more synthetic pyrethroid(s).

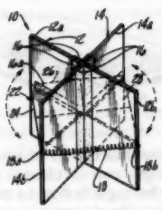
4,503,101
FOLDABLE, POP-OPEN CORNER REFLECTOR DECOY TARGET ARTICLES

John G. Bennett, Macomb, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 6, 1983, Ser. No. 529,440

Int. Cl.³ A47G *33/08;* G09F *19/00*

U.S. Cl. 428—9 **5 Claims**



1. A self expanding multipanel device comprising: four basic panel members having a common longitudinal axis; hinge means attached to the basic panel members along the common axis to join said panel members into a foldable unit about the common axis so as to provide a relatively flat multiple layer package in the folded condition and to form four orthogonally disposed panels in the deployed position; four flexible, quadrant spanning panels each of said quadrant spanning panels being disposed between the surfaces of two adjacent basic panel members and being flexibly attached to the surfaces of the two adjacent basic panels near the midline of said surfaces so that in the deployed position each quadrant spanning member and the associated surface of the two basic panels to which it is attached form two trihedral angles; and biasing means adapted to open the basic panel means from a closed to a deployed position said biasing means comprising a first resilient chord having one end attached to one of said adjacent basic panels and the other end attached to the quadrant panel associated with said basic panel the resilient means being attached to the quadrant panel at a point beyond the midline of said quadrant panel when measured from the basic panel, and a second resilient chord having one end attached to the other adjacent basic panel and being disposed on the opposite side of the quadrant panel from said first resilient chord and being further attached to said quadrant panel at a point beyond the midline from said basic panel so that in the folded condition, the resilient chords will tend to pull the device into the deployed configuration.

4,503,102
POUCHES OF ETHYLENE-α-OLEFIN COPOLYMER/ETHYLENE-VINYL ACETATE COPOLYMER BLENDS

Alistair N. Mollison, Kingston, Canada, assignor to Du Pont of Canada, Inc., Montreal, Canada

Filed Jun. 2, 1983, Ser. No. 500,385

Claims priority, application United Kingdom, Jun. 2, 1982, 8201601

Int. Cl.³ B32B *27/34;* C08F *37/18;* C08J *1/40*

U.S. Cl. 428—35 **10 Claims**

1. A pouch containing a flowable material said pouch being made from a sealant film in tubular form and having transversely heat-sealed ends, said film being made from a blend of a linear ethylene-C_4–C_{10}-α-olefin copolymer and an ethylene-vinyl acetate copolymer, said ethylene-C_4–C_{10}-α-olefin copolymer having a density of from 0.916 to 0.930 g/cm and a melt index of from 0.3 to 2.0 dg/min, said ethylene-vinyl acetate copolymer having a weight ratio of ethylene to vinyl acetate from 2.2:1 to 24:1 and a melt index of from 0.2 to 10 dg/min, said blend having a weight ratio of linear ethylene-C_4–C_{10}-α-olefin copolymer to ethylene-vinyl acetate copolymer of from 1.2:1 to 9:1.

4,503,103
ENCLOSURE MEMBER CONSISTING ESSENTIALLY OF SOLID, NON-AROMATIC POLYMERS

Roger A. Shefford, Aldershot, England, assignor to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands

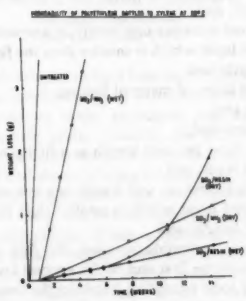
Filed Sep. 7, 1983, Ser. No. 529,947

Claims priority, application United Kingdom, Sep. 7, 1982, 8225441

The portion of the term of this patent subsequent to Feb. 1, 2000, has been disclaimed.

Int. Cl.³ B05D *3/00;* B65D *23/00*

U.S. Cl. 428—35 **5 Claims**



1. An enclosure member consisting essentially of solid, non-

aromatic polymers that have a linear carbon to carbon backbone structure and have a plurality of free hydrogen atoms attached to the carbon atoms with a permeability to wet and dry solvents and fuels of less than 1/50 of the permeability of untreated enclosure members having a thickness of 1 mm, the enclosure having an inner and outer surface having a portion of the hydrogen atoms replaced by sulphonic acid or sulphonate groups and being coated with a cured thin layer having a thickness of at least 2 micrometers of a mixture of 90 to 0 weight % of a resin made by the reaction of urea and formaldehyde in a molar ratio of from 1:1,1 to 1,7, respectively of melamine and formaldehyde in a molar ratio of from 1:1,2 to 1:4,0 with 10 to 70 weight % of furfuryl alcohol added during the reaction and 10–100 weight % of an oligomer consisting of a polymer of furfuryl alcohol and 0 to 100 mole %—calculated on the furfuryl alcohol—of formaldehyde with a degree of polymerisation between 1 and 10.

4,503,104

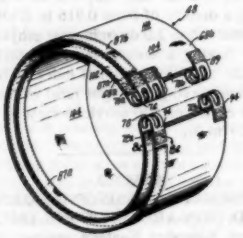
CONTAINMENT STRUCTURE

Homer J. Belanger, and Angelo M. Patacca, both of Glastonbury, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 332,698, Dec. 21, 1981,. This application Sep. 9, 1983, Ser. No. 530,797

Int. Cl.³ F16L *59/16*

U.S. Cl. 428—36 **8 Claims**



1. A fabric for forming the flexible casing of a containment structure which comprises:

a band of material having a continuous inner surface and a continuous outer surface, the band including

a first layer of material having

a first end,

a second end,

a first mass per unit length in a first portion of the first layer, and

a second mass per unit length in a second portion of the first layer which is smaller than the first mass per unit length; and

a second layer of material having

a first end,

a second end,

a first mass per unit length in a first portion of the second layer, and

a second mass per unit length in a second portion of the second layer which is smaller than the first mass per unit length; and

a first loop extending between the first end of the first layer and the first end of the second layer;

a second loop extending between the second end of the first layer and second end of the second layer.

4,503,105

PLASTIC CORE FOR AN ELASTICALLY SHRINKABLE TUBULAR COVER

Shigeo Tomioka, Tokyo, Japan, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 20, 1984, Ser. No. 572,505

Claims priority, application Japan, Feb. 4, 1983, 58-15355[U]

Int. Cl.³ F16L *11/00*

U.S. Cl. 428—36 **1 Claim**

1. A hollow tubular plastic core for supporting an elastic tubular cover member in highly radially stretched condition so that the cover member can be positioned over a generally cylindrical object and the core removed to permit the cover member to contract to conform to the outer surface of the object, said hollow core comprising a cylindrical plastic tube with an internal diameter greater than the external diameter of the object to be covered and having a plurality of circumferentially spaced, axially extending lugs on the inner wall of said tube, a continuous helical cut in the wall of said tube from the exterior surface thereof severing said tube into a continuous narrow strip with only the lugs connected axially along the length of said tube, and one end of said strip being free from the tube for a distance and extending back through the tube.

4,503,106

CONSTRUCTION BARRIER BOARD

Joseph A. Cogliano, Pasadena, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 402,747, Jul. 28, 1982, Pat. No. 4,450,192. This application May 21, 1984, Ser. No. 612,376

Int. Cl.³ B32B *1/04, 3/02, 3/12, 11/04*

U.S. Cl. 428—40 **9 Claims**

1. A preformed sheet-like barrier consisting essentially of

(a) a substantially rigid, porous, closed-cellular, substantially planar structure having a first and a second major surface and edges defining the dimensions of said structure, said structure having a thickness of from about 0.25 inch to 10 inches;

(b) an adhesive bituminous sheet formed from blends of bituminous material and a natural or synthetic rubber or resin, said sheet having a first and a second major surface and edges defining the dimensions of sheet and having a thickness or at least 0.01 inch, wherein the first major surface of said sheet is in contact with and self-adhered to the substantial entire first major surface of said porous structure;

(c) a coating which is substantially non-adherent with re-

spect to said adhesive bituminous sheet, said coating being a removable sheet which is substantially coextensive and congruent with the second major surface of the adhesive bituminous sheet;

(d) a coating which is decorative and/or wear-enhancing, said coating affixed to the second major surface of said porous structure and substantially coextensive and congruent thereto;

said porous structure (a) and said sheet (b) are each substantially in the form of a quadrilateral parallelogram, each of two adjacent edges of said sheet extend beyond each of two adjacent edges of said porous structure respectively, are in contact with each other at one corner section of the barrier and are substantially parallel to each of the two adjacent edges of said porous structure; and each of the two remaining adjacent edges of said sheet are substantially congruent with each of the two remaining adjacent edges of said porous structure, respectively.

4,503,107

CONSTRUCTION BARRIER BOARD

Joseph A. Cogliano, Pasadena, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 402,748, Jul. 28, 1982, Pat. No. 4,448,830. This application May 21, 1984, Ser. No. 612,377

Int. Cl.³ B32B *1/04, 3/02, 3/12, 11/04*

U.S. Cl. 428—40 **12 Claims**

1. A preformed sheet-like barrier consisting essentially of

(a) a substantially rigid, porous, open-celled, substantially planar structure having a first and a second major surface and edges defining the dimensions of said structure, said structure having a thickness of from about 0.25 inch to 10 inches;

(b) an adhesive bituminous sheet formed from blends of bituminous material and a natural or synthetic rubber or resin, said sheet having a first and a second major surface and edges defining the dimensions of said sheet and having a thickness of at least 0.01 inch, wherein the first major surface of said sheet is in contact with and self adhered to the substantial entire first major surface of said porous structure, said sheet having embedded therein a flexible woven or non-woven fibrous cloth or web or a flexible polymeric film;

(c) a coating which is substantially non-adherent with respect to said adhesive bituminous sheet, said coating being a removable sheet which is substantially coextensive and congruent with the second major surface of the adhesive bituminous sheet or said coating being a film of substantially non-adherent material applied to at least the substantial entire second major surface of said porous structure;

said porous structure (a) and said sheet (b) are each substantially in the form of a quadrilateral parallelogram, each of two adjacent edges of said sheet extend beyond each of two adjacent edges of said porous structure, respectively, are in contact with each other at one corner section of the barrier and are each substantially parallel to each of the two adjacent edges of said porous structure; and each of the two remaining adjacent edges of said sheet are substantially congruent with each of the two remaining adjacent edges of said porous structure, respectively.

4,503,108

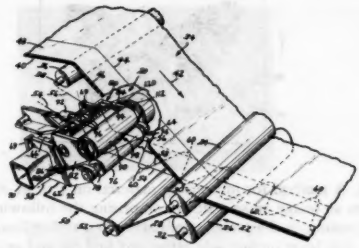
REINFORCED PAPER PRODUCT

Victor H. Clausen, and Charles E. Asbury, both of Vancouver, Wash., assignors to H. B. Fuller Company, St. Paul, Minn.

Division of Ser. No. 322,893, Nov. 19, 1981, Pat. No. 4,451,515. This application Dec. 2, 1983, Ser. No. 557,649

Int. Cl.³ B32B *3/02, 29/02*

U.S. Cl. 428—108 **5 Claims**



1. A reinforced paper product, comprising:

(a) a plurality of overlying paper sheet substrates;

(b) means for adhering adjacent of said substrates together in said overlying relationship;

(c) wherein said product thereby formed is scored to bifurcate said product into two portions, one on either side of said scoring, defining planes, the angle between which can be varied by pivoting one of said portions relative to the other of said portions about said scoring

(d) a filament reinforcing network bonded to and intermediate adjacent of said adhering substrates comprising:

(i) a plurality of generally parallel and generally linearly extending filaments straddling said scoring; and

(ii) a plurality of generally sinusoidally configured filaments, each sinuating across and bonded to pairs of adjacent of said generally linearly extending filaments.

4,503,109

BONDED AGGREGATE STRUCTURES AND PRODUCTION THEREOF

Calvin Shubow, 30995 Hunter's Dr., Farmington, Mich. 48024, and Robert V. Skinner, 1N 281 Prairie, Glen Ellyn, Ill. 60137

Division of Ser. No. 325,393, Nov. 27, 1981, Pat. No. 4,419,133. This application Apr. 27, 1983, Ser. No. 488,938

The portion of the term of this patent subsequent to Dec. 6, 2000, has been disclaimed.

Int. Cl.³ C04B *9/04*

U.S. Cl. 428—161 **21 Claims**

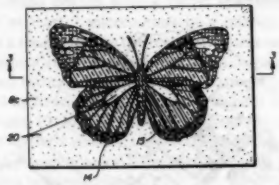
1. A laminated brooder radiant heat panel structure obtained by establishing a non-ammoniacal workable mixture of magnesium oxide, aluminum oxide, aggregate, and aqeuous mono aluminum phosphate acidic solution, the weight of ratio of aluminum oxide to acidic solution (expressed as 50% solution with P_2O_5: Al_2O_3 of about 4) being from about 1:1 to about 1:3, the weight ratio of magnesium oxice to aluminum oxide being from about 1:1 to about 1:6, and the quantity of acidic solution relative to the total mixture being sufficient prior to setting to impart lubricity to the mixture; applying the mixture to the energy transmissive backing of a rigid radiant heat panel; and allowing the thus applied mixture to set to form a bonded aggregate insulative cover for the rigid panel.

4,503,110

FOIL EMBOSSING METHOD

Paula H. Skene, 6046 Claremont, Oakland, Calif. 94618

Filed Jul. 26, 1982, Ser. No. 401,503
Int. Cl.³ B32B *3/28, 31/20*
U.S. Cl. 428—164 **8 Claims**



1. A method for impressing material on a sheet of stock to form an image on said stock comprising the following steps:

pressing, in the presence of heat, a first ribbon having a first foil layer on one side between a first die and said stock to transfer a portion of said first foil from said first ribbon onto said stock according to the shape of said first die;

placing a second ribbon having a second, transparent pastel foil layer on one side over at least a portion of the transferred first foil on said stock;

pressing, in the presence of heat, said second ribbon against said stock with a second die thereby transferring said second foil onto said stock in a second pattern, said second pattern at least partially superimposed over said first pattern; and

embossing said stock between an embossing die and counterdie.

4,503,111

HYDROPHOBIC SUBSTRATE WITH COATING RECEPTIVE TO INKS

Charles W. Jaeger, Beaverton; Donald R. Titterington, Cornelius, and Le P. Hue, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed May 9, 1983, Ser. No. 493,127
Int. Cl.³ B32B *27/06;* **B05D** *5/06;* **G01D** *15/18*
U.S. Cl. 428—195 **8 Claims**

1. A transparent recording medium for ink jet printing, comprising a transparent support layer having a substantially hydrophobic surface with a transparent surface coating receptive to aqueous inks, said coating comprising a mixture of polyvinylpyrrolidone and a compatible matrix-forming hydrophilic polymer selected from the group consisting of gelatin and polyvinyl alcohol, the ratio of polyvinylpyrrolidone to matrix-forming polymer being in the range of 1:3 to 3:1, the polyvinylpyrrolidone having a molecular weight of at least 90,000.

4,503,112

PRINTED CIRCUIT MATERIAL

Jiri K. Konicek, Bennington, Vt., assignor to Oak Industries Inc., Rancho Bernardo, Calif.

Division of Ser. No. 272,988, Jun. 12, 1981, Pat. No. 4,394,419. This application May 5, 1983, Ser. No. 490,983
Int. Cl.³ C23F *1/00;* **C25D** *5/10*
U.S. Cl. 428—216 **6 Claims**

1. A product useful in the manufacture of printed circuits comprising a dielectric material core including one or more layers of printed circuits and a metallic foil adhered to opposite sides thereof, said metallic foil including,

(a) a carrier layer of copper fully removable by etching and having a thickness on the order of about 10–35 microns,

(b) a thin layer of copper having a thickness in the range of 1–12 microns to be used in the formation of electrical circuit paths, with an adhesion promoting and passivating layer on the outer surface which surface is attached to the dielectric material core, and

(c) an intermediate metallic layer positioned between the (a) and (b) layers and secured thereto, said intermediate layer having a thickness in the range of 0.1–2.0 microns and being selected from the group consisting of nickel, a nickel-tin alloy, a nickel-iron alloy, lead, and a tin-lead alloy, said intermediate layer adhering sufficiently to the (b) layer of copper to prevent removal thereof by an etchant removing the (a) layer of copper.

4,503,113

PAPERMAKER FELT WITH A THREE-LAYERED BASE FABRIC

Frederick R. Smart, Averill Park, N.Y., assignor to Huyck Corporation, Wake Forest, N.C.

Filed Mar. 12, 1982, Ser. No. 357,409
Int. Cl.³ D03D *11/00, 13/00, 25/00;* **D21F** *7/08*
U.S. Cl. 428—234 **23 Claims**

1. A papermaker's felt comprising:

a non-woven batting material; and

a woven three-layer base fabric comprising:

a bottom layer of cross-machine direction and machine direction yarns;

a middle layer of fine yarns which has a higher cross-machine direction and machine direction yarn count than the bottom layer and in which the cross-machine direction and machine direction yarn diameters are smaller than the diameters of the cross-machine direction and machine direction yarns in the bottom layer; and

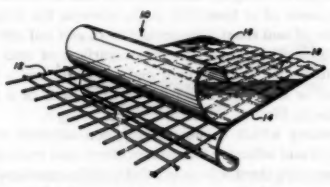
a top layer of fine yarns in which every cross-machine direction yarn is also a cross-machine direction yarn in the middle layer and in which the machine direction yarn count is the same as or higher than the machine direction yarn count of the middle layer, the diameters of the machine direction yarns of the top layer being the same as or less than the diameters of the machine direction yarns of the middle layer.

4,503,114

LAMINATED ADHESIVE BACKING FOR MIRRORS

Lewis Cohen, Hingham, Mass., assignor to Venture Tape Corp., Weymouth, Mass.

Filed Aug. 2, 1982, Ser. No. 404,314
Int. Cl.³ B32B *7/00;* **D03D** *3/00*
U.S. Cl. 428—247 **8 Claims**



1. A mirror backing laminate material comprising:

a first outer layer formed of a plastic material;

a second outer layer secured to said first outer layer, said second outer layer being formed of a plastic material;

a central reinforcing scrim disposed between said first and said second outer layers;

normally hardened means for securing said first outer layer to said second outer layer and for sealingly capturing said central scrim therebetween; and

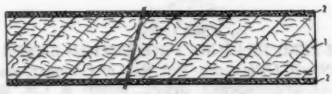
an adhesive layer applied to an outer surface of a selected one of said first and said second outer layers for securing said backing laminate material to the back of a mirror.

4,503,115

PLATE-SHAPED MOLDED ARTICLE AND PROCESS FOR ITS PREPARATION AND USE

Martinus H. Hemels, Weert, and Gerardus W. Schuren, Kelpen, both of Netherlands, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Nov. 23, 1982, Ser. No. 444,198
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1981, 3147989
Int. Cl.³ D04H 1/08
U.S. Cl. 428—281 27 Claims



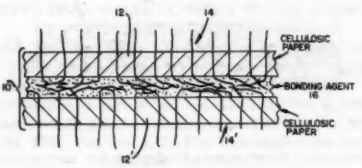
1. A decorative molded article, comprising:
a core of a fiber containing material comprised of wood or cellulose fibers which are coated with a thermosetting synthetic resin, said resin having been added to said fibers as an aqueous solution prior to heat-hardening of said resin, the content of said resin being between at least about 150 g and not more than about 900 g of resin per 1000 g of dry fibers; and
a decorative layer on at least one surface of said core, wherein the density of the molded article is between about 900 and 1600 kg/m3.

4,503,116

DENTAL ADHESIVE DEVICE AND METHOD OF PRODUCING SAME

Herbert Lapidus, Ridgefield, Conn., assignor to Combe Incorporated, White Plains, N.Y.

Continuation-in-part of Ser. No. 236,889, Feb. 23, 1981, abandoned, and a continuation-in-part of Ser. No. 346,640, Feb. 8, 1982, abandoned. This application Jun. 29, 1983, Ser. No. 508,381
Int. Cl.³ B32B 5/26
U.S. Cl. 428—286 17 Claims



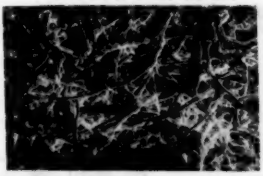
1. A new dental adhesive product comprising a laminate of superimposd fiber faced webs, each web having a carrier portion with fibers held therein and protruding therefrom to present a fiber facing on each side of each of said webs, the fibers of one face of one of said webs being dry heat bonded to the fibers of an opposing face of the other of said webs by thermoplastic ethylene oxide polymer located between said webs, said ethylene oxide polymer having been deformed by the application of dry heat and pressure whereby the ethylene oxide polymer both bonds said webs and is available to the user as a dental fixative.

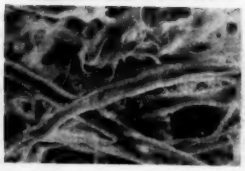
4,503,117

PAPER-POLYMER PRODUCT

James G. Murray, East Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 30, 1983, Ser. No. 566,987
Int. Cl.³ B05D 5/00
U.S. Cl. 428—311.7 9 Claims





1. A fibrous composition, comprising:
a web comprising a plurality of intersectng cellulose fibers forming an open web structure having spaces;
a polymer within the fibrous structure of the individual cellulose fibers or at the surface of the individual cellulose fibers, formed in-situ from a liquid, non-polar vinyl monomer;
the spaces of said open web structure being substantially free from said polymer so that said web maintains a fibrous character.

4,503,118

INK JET RECORDING SHEET

Mutsuaki Murakami, Kawasaki; Yasutaka Hiromori, Hirakata, and Hiroshi Naito, Machida, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Division of Ser. No. 294,152, Aug. 19, 1981, Pat. No. 4,425,405. This application Oct. 11, 1983, Ser. No. 540,893
Claims priority, application Japan, Aug. 20, 1980, 55-115236
Int. Cl.³ B32B 5/16; D21D 3/00; G01D 15/34
U.S. Cl. 428—323 7 Claims

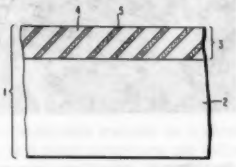
1. A recording sheet for ink jet recording made from a composition comprising a mixture of 100 parts by weight of a stock pulp, 10 to 60 parts by weight of a white filler, and 2 to 20 parts by weight of a binder resin selected from the group consisting of polyvinylpyrrolidone, vinylpyrrolidone-vinyl acetate copolymer and a mixture thereof.

4. A recording sheet according to claim 1, wherein said white filler is clay, talc, calcium carbonate, calcium sulfate, calcium silicate, diatomaceous earth, magnesium silicate, terra abla, activated clay, magnesium oxide, magnesium carbonate or aluminium hydroxide in the form of a powder.

4,503,119
MAGNETIC RECORDING MEDIA

Ryuji Shirahata; Yasuyuki Yamada; Tatsuji Kitamoto, and Goro Akashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 161,535, Jun. 20, 1980, abandoned. This application Nov. 30, 1981, Ser. No. 325,939
Claims priority, application Japan, Jun. 20, 1979, 54-77692
Int. Cl.³ H01F *1/06, 1/33*
U.S. Cl. 428—336 **11 Claims**



1. A thin film magnetic recording tape, comprising: a non-magnetic support base;

a magnetic metal thin film having a thickness of about 0.1 to 0.4μ, formed on a surface of said support base by vapor deposition conducted such that a vapor beam impinges said surface of said support at an angle of incidence ranging from about 50° to 85° so as to form diagonally extending channels between columnar structures in said magnetic metal thin film; and

a lubricant within said channels in an amount of about 5 to 100 mg/m², said lubricant comprising fatty acids having 12 to 18 carbon atoms.

4,503,120
MAGNETIC RECORDING MEDIUM

Koichi Yamauchi; Nobuo Tsuji; Yasuyuki Yamada; Shinichi Funabashi, and Masatoshi Kiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 17, 1983, Ser. No. 505,506
Claims priority, application Japan, Jun. 17, 1982, 57-104132
Int. Cl.³ G11B *5/70*
U.S. Cl. 428—336 **14 Claims**

1. A magnetic recording medium, which comprises a non-magnetic support having thereon a magnetic recording layer containing ferromagnetic fine powder and binder, said binder comprising:

(1) a vinyl chloride-vinyl acetate-maleic acid copolymer which has a mean polymerization degree of about 300 to about 400 and a maleic acid fraction of about 0.6 to about 1.5 wt%, and

(2) a polyurethane resin which has a number average molecular weight of 40,000 to 100,000 and is prepared from (i) a mixture of polyneopentyladipate having a mean molecular weight of 500 to 2,500 and polybutyleneadipate having a mean molecular weight of 500 to 2,500 with a mixing ratio of the polyneopentyladipate to polybutyleneadipate of from 2/8 to 9/1 by weight and (ii) diphenylmethane diisocyanate.

4,503,121
LAMINATE COMPOSITIONS WITH POLYARYLATE AND POLY(ARYL ETHER)

Lloyd M. Robeson, Whitehouse Station, and John W. Lynn, Westfield, both of N.J., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 335,452, Dec. 29, 1981, abandoned. This application Apr. 4, 1984, Ser. No. 596,075
Int. Cl.³ B32B *27/08*
U.S. Cl. 428—336 **11 Claims**

1. A laminate composition comprising a polyarylate, or blends thereof, derived from a dihydric phenol and an aromatic dicarboxylic acid which is laminated upon the surface of a poly(arylether) having recurring units of the formula:

—O—E—O—E'—

wherein E is the residuum of a second dihydric phenol and E' is the residuum of a dihalobenzenoid compound having an inert electron withdrawing group in at least one of the positions ortho and para to the valence bonds wherein both of said residuum are valently bonded to the ether oxygens through aromatic carbon atoms.

4,503,122
HIGH-TEMPERATURE PROTECTION LAYER

Andrew R. Nicoll, Oftersheim, Fed. Rep. of Germany, assignor to BBC Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

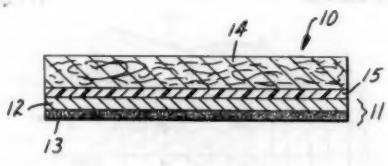
Filed Dec. 12, 1983, Ser. No. 560,734
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 3246504
Int. Cl.³ C23C *7/00*
U.S. Cl. 428—678 **8 Claims**

1. An article protected against corrosion at high-temperatures composed of a single applied high-temperature protection layer to a substrate, adapted particularly for protecting gas turbine parts of an austenitic material subjected to a high temperature, said single applied layer comprising: an oxide precipitation-hardened alloy with a base material consiting essentially of chromium, aluminum and cobalt, and at least silicon in an amount of 1 to 2.5% by weight relative to the total weight of the alloy added to the base material of the alloy as an additive prior to the application of the alloy to the substrate to induce a resistant passive cover layer of aluminum oxide to develop on the alloy when subjected to a high temperature, said applied alloy surface being without application of another layer of ceramic thereon.

4,503,123
INNER SEAL FOR CAPPED CONTAINERS

David T. Ou-Yang, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 22, 1983, Ser. No. 524,873
Int. Cl.³ C09J *7/02*
U.S. Cl. 428—349 **9 Claims**



1. Composite sheet material adapted for tamper-resistant heat sealing of jars, bottles, and the like, comprising a layer of aluminum foil to one face of which is bonded a stratum of heat-sealable adhesive that constitutes an exposed surface of the sheet material and is substantially tackfree at room temperature, said adhesive comprising 100 parts by weight of an intimate blend of (a) about 5–70 parts by weight of an acrylate polymer formed from monomeric acrylate units selected from the class consisting of methyl acrylate and ethyl acrylate and (b) about 25–85 parts by weight of a vinyl polymer having a number average molecular weight of about 8,000–40,000 and formed from monomeric vinyl units of which at least about 60 weight percent are vinyl chloride, the total of (a)+(b) equaling at least about 65 parts by weight.

4,503,124

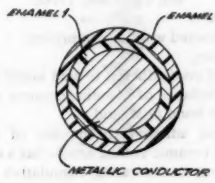
CORONA-RESISTANT WIRE ENAMEL COMPOSITIONS AND CONDUCTORS INSULATED THEREWITH

John J. Keane, Ballston, and Denis R. Pauze, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 374,844, May 5, 1982,. This application Mar. 30, 1983, Ser. No. 480,626

Int. Cl.³ B32B 9/00, 15/00, 27/00; H01B 7/00

U.S. Cl. 428—372 5 Claims



1. An electrical conductor coated with a corona-resistant wire enamel comprising a polyimide, polyesterimide or polyamideimide resin or mixtures thereof containing from about 1% to about 35% by weight of alumina particles having a size less than about 0.1 micron, said alumina particles having been dispersed in said resin by high shear mixing.

4,503,125

PROTECTIVE OVERCOATING FOR MAGNETIC RECORDING DISCS AND METHOD FOR FORMING THE SAME

Carl W. Nelson, and Michael B. Vye, both of Santa Cruz, Calif., assignors to Xebec, Inc., San Jose, Calif.

Continuation of Ser. No. 080,481, Oct. 1, 1979, abandoned. This application Jun. 5, 1981, Ser. No. 270,686

Int. Cl.³ G11B 5/72

U.S. Cl. 428—408 6 Claims

1. A protective overcoating for a magnetic alloy thin-film recording disc that includes a disc-shaped base over which is formed a magnetic alloy film to provide a magnetic recording medium, comprising:

a. an interfacial layer of titanium bondable to both the magnetic medium of the recording disc and to carbon; and

b. a layer of carbon formed by sputter deposition over said interfacial layer.

4,503,126

METHOD OF MAKING AN ABRASION RESISTANT COATING ON A SOLID SUBSTRATE AND ARTICLES PRODUCED THEREBY

Richard A. Phillips, Acton, and Theodore A. Haddad, Leominster, both of Mass., assignors to Foster Grant Corporation, Leominster, Mass.

Continuation-in-part of Ser. No. 439,094, Nov. 4, 1982, abandoned, which is a continuation-in-part of Ser. No. 409,272, Aug. 18, 1982, Pat. No. 4,435,476. This application Jan. 13, 1984, Ser. No. 570,471

Int. Cl.³ B05D 3/06; B32B 27/12, 27/30, 13/08

U.S. Cl. 428—412 20 Claims

1. A method of improving the abrasion resistance of cross-linked organosiloxane coating, said coating having been prepared by applying to a solid substrate an organosilanol coating liquid comprising as a main ingredient organosilanol molecules, at least 90 mole percent of which being trifunctional silanols of the formula $RSi(OH)_3$ where R is a hydrocarbon radical, and at least 50 mole percent of said trifunctional silanols being an alkyltrisilanol of 1-3 carbons or phenyltrisilanol, or a precursor thereof or a partial hydrolysis product thereof and by curing the resultant coating in order to obtain an abrasion resistant, cross-linked organosiloxane coating, which method comprises an electron beam treatment of said cross-linked organosiloxane coating.

11. A solid substrate coated with an abrasion-resistant cross-linked organosiloxane coating comprising the cross-linked condensation product of organosilanol molecules at least 90 mole percent of which being trifunctional silanols of the formula $RSi(OH)_3$ where R is a hydrocarbon radical, and at least 50 mole percent of said trifunctional silanols being an alkyltrisilanol of 1-3 carbons or phenyltrisilanol, a precursor thereof or a partial hydrolysis product thereof that has been electron beam treated subsequent to condensation and cross-linking.

4,503,127

HOT OIL PRETREATMENT OF FRIED VEGETABLE PRODUCTS

Lucy L. Fan, and Javier A. Arce, both of Irving, Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed Dec. 5, 1983, Ser. No. 558,350

Int. Cl.³ A23L 1/212, 1/216

U.S. Cl. 426—438 9 Claims

1. A method for preparing fried vegetable products which eliminates stickiness and clumping of individual whole, sliced or chopped vegetables during frying, the method comprising:

(a) heating whole, sliced or chopped vegetables containing the enzyme pectin methylesterase in edible vegetable oil to a temperature high enough to activate the enzyme but less than the gelatinization temperature of the vegetable starch, and then

(b) frying the vegetables in an edible vegetable oil.

4,503,128

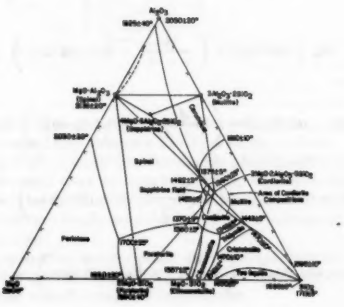
THERMALLY SPRAYABLE CERAMICS

Robert W. Iseli, 1919 Beechwood Dr., Florence, Ala. 35630, and Herbert Herman, 11 Meroke Trail, Port Jefferson, N.Y. 11777

Continuation of Ser. No. 294,250, Aug. 19, 1981, abandoned. This application Jan. 4, 1984, Ser. No. 568,265

Int. Cl.³ B32B 9/04, 15/04, 15/20

U.S. Cl. 428—446 16 Claims



1. A component comprised of a substrate which has a metallic surface and which is susceptible to abrasion and erosion at high temperatures and a porous, abradable, erosion, shock and temperature resistant, triple oxide coating which has low thermal conductivity tightly bonded to said metallic surface of said substrate, said coating being, at least in part, a reaction product of a fully fused, thermally sprayable cordierite coating precursor which is capable of releasing sufficient exothermic energy when heated to promote adhesion between the coating and the substrate.

2. A component comprised of a substrate which has a metallic surface and a coating which is capable of absorbing sound and/or other vibrations tightly bonded to said metallic surface of said substrate, said coating being, at least in part, a reaction

product of a fully fused, thermally sprayable cordierite coating precursor which is capable of releasing sufficient exothermic energy when heated to promote the adhesion of the coating to the substrate.

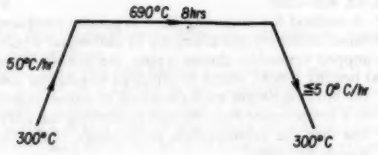
6. A component as defined in claim 1 or in claim 2 wherein the cordierite constituent of said coating precursor has the formula $2MgO5SiO_22Al_2O_3$.

4,503,129

SHIELDED METAL ARC WELDING ELECTRODE FOR CR-MO LOW ALLOY STEELS

Naoki Okuda, Kamakura; Akihiko Usui, Fujisawa; Shigeaki Yamamoto, Kanagawa, and Shogo Natsume, Kamakura, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 3, 1982, Ser. No. 414,938
Claims priority, application Japan, Sep. 10, 1981, 56-143365
Int. Cl.³ B22F *7/04;* **B32B** *15/02;* **B23K** *35/34*
U.S. Cl. 428—562 **7 Claims**



1. A shielded metal arc welding electrode comprising in a core wire or a covering flux thereof the alloy elements C, Mn, Si, Cr, Mo, Al, N, and Ni in the proportions satisfying the following equations:

$$\{B_w \times (C\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (C\ \%)_f\right\} \leqq 0.13\%$$

$$\{B_w \times (Mn\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (Mn\ \%)_f\right\} \leqq 1.0\%$$

$$\{B_w \times (Si\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (Si\ \%)_f\right\} \leqq 0.6\%$$

$$\{B_w \times (Cr\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (Cr\ \%)_f\right\} = 0.5\text{–}3.5\%$$

$$\{B_w \times (Mo\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (Mo\ \%)_f\right\} = 0.3\text{–}1.5\%$$

$$\{B_w \times (Al\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (Al\ \%)_f\right\} = 0.002\text{–}0.04\%$$

$$\{B_w \times (N\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (N\ \%)_f\right\} = 0.018\text{–}0.045\%$$

$$\{B_w \times (Ni\ \%)_w\} + \left\{\frac{A_f}{1-A_f} \times B_f \times (Ni\ \%)_f\right\} \leqq 0.3\%$$

wherein B_w is a coefficient of yield in deposited metal of a wire-originating element; B_f is a coefficient of yield in the deposited metal of a flux-originating element; (elemental symbol %)$_w$ is the percentage by weight of a component element of the core wire to be total weight thereof; (elemental symbol %)$_f$ is the percentage by weight of a component element of the flux to the total weight thereof; and A_f is the flux ratio, which is the weight ratio of the applied flux to the total weight of the welding electrode.

4,503,130

PRESTRESSED CERAMIC COATINGS

George S. Bosshart, Vernon, and Alfred P. Matarese, North Haven, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 330,401, Dec. 14, 1981, Pat. No. 4,481,237. This application Mar. 10, 1983, Ser. No. 474,117
Int. Cl.³ C03C *17/06*
U.S. Cl. 428—632 **2 Claims**

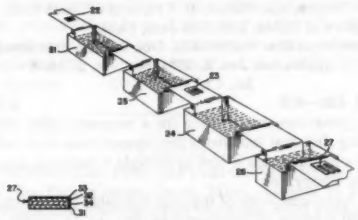
1. A ceramic coated article, comprising:
a metal substrate;
a metallic bond coat adhered to said initial substrate;
at least one interlayer of metallic/ceramic composition adhered to said bond coat; and
a ceramic layer adhered to the last of said interlayers wherein said ceramic coated article has a strain characteristic exhibiting an increasing cumulative strain from the substrate through the ceramic layer and substantially free of strain reversals across the depth of the coating.

4,503,131

ELECTRICAL CONTACT MATERIALS

Donald W. Baudrand, Lincolnshire, Ill., assignor to Richardson Chemical Company, Des Plaines, Ill.

Filed Jan. 18, 1982, Ser. No. 340,369
Int. Cl.³ C23C *3/02;* **H01H** *1/02*
U.S. Cl. 428—672 **41 Claims**



1. An electrical contact material comprising, in combination: an electrically conductive basis metal layer, an electroless nickel barrier layer deposit over the basis metal layer, and a thin overlayer laid down onto said electroless nickel barrier layer, the thin overlayer being a layer of up to about 10 microinches of a precious metal deposit, said combination electrical contact material having contact resistance properties substantially the same as other electrical contact materials having a thick gold overlayer that is significantly thicker than 10 microinches, wherein said barrier layer deposit is an electroless nickel deposit selected from the group consisting of a nickel-boron deposit from an electroless bath including a boron deposition enhancer haing zirconyl or vanadyl ions and a nickel-phosphorus deposit from an electroless bath including an unsaturated carboxylic acid tensile stress reduction agent.

4,503,132

FUEL CELL ELECTRODE

Ralph C. Struthers, 39503 Calle El Fuente, Saugus, Calif. 91350

Filed Mar. 7, 1983, Ser. No. 473,036
Int. Cl.³ H01M *4/06*
U.S. Cl. 429—40 **16 Claims**

1. A fuel cell gas electrode positioned between and separating gas and liquid medium in a fuel cell, said electrode includes a flat structural support and electric conductor part of perforated sheet metal having front and rear surfaces and positioned in said cell with its rear surface disposed toward said gas me-

dium, a thin, flat hydrophobic gas separating membrane permeable by a selected gas and having front and rear surfaces positioned with its rear surface in supported contact with the front surface of said part, a flat metallic liquid and gas permeable current collector with front and rear surfaces positioned with its rear surface in spaced opposing relationship with the front surface of said membrane and with its front surface disposed toward the liquid medium, a catalytic barrier structure

of bonded together particulate catalytic material carried by the current collector in electric conducting contact therewith and having a rear surface in uniform contact with the front surface of the membrane and a plurality of electric conducting mechanical fasteners in spaced relationship throughout and engaged with and between said part and current collector securing the parts of the electrode in assembled relationship and electrically connecting the current collector with said part.

4,503,133

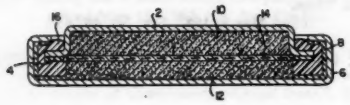
LEAK RESISTANT GALVANIC CELL AND PROCESS FOR THE PRODUCTION THEREOF

Johannes A. van Lier, Euclid, Ohio, and Hirotsugu Yasuda, Newburg, Mo., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 564,491, Dec. 22, 1983, abandoned. This application May 23, 1984, Ser. No. 613,196

Int. Cl.³ H01M *2/08*

U.S. Cl. 429—174 **60 Claims**



1. A sealed galvanic cell comprising a cathodic material, an anodic material and an electrolyte housed in a container having an open end and a container sealing surface, said container being sealed at its open end by a cover having a cover sealing surface with a non-conductive gasket compressively disposed between said cover and said container, said gasket having a first gasket sealing surface and a second gasket sealing surface, said first gasket sealing surface and said second gasket sealing surface being in interfacial sealing contact with the container sealing surface and the cover sealing surface respectively: characterized in that at least a portion of at least one of the cover sealing surface, the container sealing surface, the first gasket sealing surface and the second gasket sealing surface is coated with a tightly adhering layer of polymeric material which is no thicker than about 2000 angstroms, such polymeric layer being comprised of a plasma polymer of at least one component selected from the group consisting of hydrocarbons, oxygen-containing hydrocarbons, nitrogen-containing hydrocarbons, sulfur-containing hydrocarbons, phosphorous-containing hydrocarbons, and organometallic compounds, said polymeric layer having been deposited by plasma polymerization.

4,503,134

METHOD OF MODIFYING SURFACE OF COLORED MICRO-FILTER ELEMENT

Kenji Matsumoto; Kazuharu Kawashima, and Jun Hayashi, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 25, 1983, Ser. No. 498,103

Claims priority, application Japan, May 28, 1982, 57-89876

Int. Cl.³ G03F *5/00*

U.S. Cl. 430—7 **8 Claims**

1. A method of modifying a surface of a colored micro-filter element for a color imaging device, with substantially no occurrence of reticulation on said surface,

which comprises;

hardening the surface of the colored micro-filter element formed on an image sensing surface of an imaging device or on a transparent support to be superposed on the image sensing surface;

and

treating the so hardened surface of the colored micro-filter element successively with an aqueous acidic solution containing tannic acid and an aqueous solution containing an alkali metal salt of antimonyl tartrate.

4,503,135

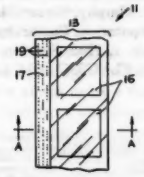
MEDIUM FOR RECORDING VISUAL IMAGES AND LASER WRITTEN DATA

Jerome Drexler, Los Altos Hills, Calif., assignor to Drexler Technology Corporation, Mountain View, Calif.

Continuation-in-part of Ser. No. 238,832, Feb. 27, 1981, Pat. No. 4,360,728, and Ser. No. 238,833, Feb. 27, 1981, abandoned. This application Nov. 22, 1982, Ser. No. 443,596

Int. Cl.³ G03C *3/00*

U.S. Cl. 430—12 **8 Claims**



1. An optical data and image medium comprising,

a photographic film substrate having a major surface,

a coating of photosensitive silver-halide photographic emulsion disposed over said major surface, said silver-halide emulsion being photographically exposed and developed so as to form visually readable information in areas on said surface, and

a direct-read-after-write optical data storage lamella disposed on said surface in areas in side-by-side relationship with said visually readable information.

4,503,136

TWO-COMPONENT RESIN SYSTEM OF ACRYLIC AND DIENE POLYMERS FOR COATING ELECTROPHOTOGRAPHIC CARRIER PARTICLES

Kenkichi Hara; Shigeo Yokoe; Kazuyoshi Oka, all of Gunma; Tamotsu Murakami, and Tsugifusa Hashimoto, both of Kanagawa, all of Japan, assignors to Kanto Denka Kogyo Co., Ltd., Tokyo and Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, both of, Japan

Filed Jan. 24, 1983, Ser. No. 460,543

Claims priority, application Japan, Jul. 2, 1982, 57-115249

Int. Cl.³ G03G *9/10*

U.S. Cl. 430—106.6 **6 Claims**

1. An electrographic carrier comprising a particulate core

material coated with a two-component resin composition consisting essentially of an epoxidized-hydroxylated 1,3-pentadiene polymer and an acrylic resin, said polymer having a hydroxyl equivalent of from about 500–1200 and an epoxy equivalent of from about 400–1000.

4,503,137

IMAGE-FORMING PROCESS

Satoru Sawada, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 16, 1984, Ser. No. 580,923
Claims priority, application Japan, Feb. 18, 1983, 58-26008
Int. Cl.³ G03C *1/40, 5/54*
U.S. Cl. 430—203 **18 Claims**

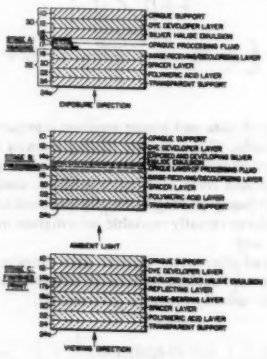
1. A process for imagewise forming a mobile dye, which comprises heating, after or simultaneously with image exposure, a light-sensitive material having on a support a photosensitive silver halide, a binder, and an immobile dye-providing material which releases a dye by heating, and which is reductive and by heating becomes a material not releasing a dye by causing an oxidation reaction with the photosensitive silver halide at a portion where a silver halide is reduced to form silver.

4,503,138

IMAGE-RECEIVING ELEMENT WITH UNITARY IMAGE-RECEIVING AND DECOLORIZING LAYER

Irena Y. Bronstein-Bonte, Newton; Edward P. Lindholm, Boston, and Richard J. Murphy, Somerville, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

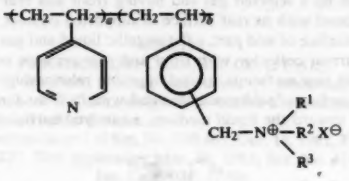
Filed Sep. 1, 1983, Ser. No. 528,557
Int. Cl.³ G03C *5/54, 1/40*
U.S. Cl. 430—213 **3 Claims**



1. An integral negative-positive diffusion transfer film unit which comprises in superposed fixed relationship before and after photoexposure:

a photosensitive element comprising an opaque support carrying a plurality of layers including at least one photosensitive silver halide layer having associated therewith a diffusion transfer process image dye-providing material;

an image-receiving element including a transparent support and a unitary image-receiving and decolorizing layer comprising a mixture of gelatin, succinic acid, and a copolymeric mordant comprising recurring units according to the formula



wherein each of R^1, R^2 and R^3 is alkyl, $X^{\ominus}$ is halogen and the molar ratio of the respective recurring units represented by integers a and b is in the range of from about 0.3:1 to about 5:1, the ratio of said copolymeric mordant to said gelatin being in the range of from about 0.6:1 to about 1:1 by weight, and the ratio of said succinic acid to said copolymeric mordant being in the range of about 0.4:1 to about 0.8:1 by weight; and

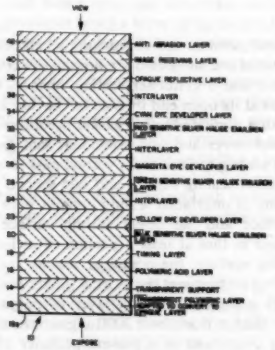
a rupturable container releasably holding an aqueous alkaline processing composition including a pH-sensitive phthalein dye and a light-reflecting pigment, said rupturable container being positioned transverse the leading edge of said film unit so as to release said processing composition for distribution between said elements after photoexposure to provide a light-reflecting layer against which a dye image formed in said unitary image-receiving and decolorizing layer may be viewed through said transparent support without separation of said superposed photosensitive and image-receiving elements.

4,503,139

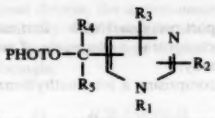
PHOTOGRAPHIC PRODUCTS AND PROCESSES AND NOVEL COMPOUNDS

James R. Bartels-Keith, Lexington; Roger A. Boggs, Wayland; Anthony J. Puttick, Arlington, and Nancy M. Sofen, Cambridge, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 9, 1983, Ser. No. 492,695
Int. Cl.³ G03C *5/54, 1/10, 1/30, 1/40*
U.S. Cl. 430—219 **26 Claims**



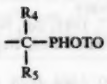
18. A diffusion transfer photographic element comprising a transparent support carrying a photosensitive system comprising a silver halide emulsion layer in association with an image dye-providing material layer and an image receiving layer, said photosensitive system including a compound represented by the formula



wherein

R_1 is hydrogen, a hydrolyzable group or a group which is cleavable in aqueous alkaline environment;

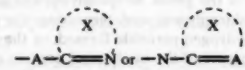
R_2 and R_3 are the same or different and are hydrogen, a substituent which modifies a property of said compound, or, when



is attached to the 2-position, taken together form a five or six member carbocyclic or heterocyclic ring;

R_4 and R_5 are the same or different and are hydrogen or alkyl; and

PHOTO is a moiety represented by the formula



wherein A is sulfur or selenium; and X represents the non-metallic atoms necessary to form a nucleus which completes a five or six member heterocyclic moiety;

or a photographically acceptable acid addition salt thereof.

4,503,140

RADIATION-SENSITIVE COMPOSITIONS OF POLYMERS CONTAINING A π-METAL CARBONYL COMPLEX OF CONJUGATED POLYOLEFIN

Robin E. Wright, Inver Grove Heights, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 18, 1982, Ser. No. 379,341

Int. Cl.³ G03C 1/71

U.S. Cl. 430—289 **19 Claims**

3. A radiation-sensitive composition comprising at least 10 percent by weight of components selected from I, II, III and IV, wherein:

I is equal to 0 to 100 percent by weight of a copolymer comprising:

(a) 5 to 60 mol percent of units derived from monomer 1,

(b) 5 to 40 mol percent of units derived from monomer 2,

(c) 0 to 90 mol percent of units derived from monomer 3; and

II is equal to 0 to 100 percent by weight of a composition comprising:

(a) 75 to 95 percent by weight of a copolymer comprising:

(1) 5 to 60 mol percent of units derived from monomer 1, and

(2) 95 to 40 mol percent of units derived from monomer 3, and

(b) 25 to 5 percent by weight of a polynucleophile; and

III is equal to 0 to 100 percent by weight of a composition comprising:

(a) 10 to 80 percent by weight of a polymer comprising 5 to 60 mol percent of units derived from monomer 1, and 95 to 40 mol percent of units derived from monomer 3, and

(b) 90 to 20 percent by weight of a polymer comprising 5 to 100 mol percent of units derived from monomer 2, and 95 to 0 mol percent of units derived from monomer 3; and

IV is equal to 0 to 100 percent by weight of a composition comprising:

(a) 75 to 95 percent by weight of a copolymer comprising:

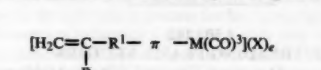
(1) 5 to 100 mol percent of units derived from monomer 2, and

(2) 95 to 0 mol percent of units derived from monomer 3, and

(b) 25 to 5 percent by weight of a non-polymeric radiation-sensitive organic compound substituted by two to four π-bonded metal-carbonyl groups; and

up to 90 percent by weight of organic polymeric binders, fillers, or other adjuvants; wherein:

monomer 1 is a radiation-sensitive, conjugated polyolefin substituted by an ethylenically-unsaturated group and π-bonded to a metal-carbonyl having the formula

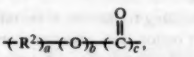


(monomer 1)

wherein:

R is a hydrogen or methyl;

R^1 is (1) a covalent bond, or (2) a divalent group,



in which R^2 is an alkylene or alkyenylene group having 1 to 4 carbon atoms, a, b, and c are independently zero or one, but at least one of a, b, and c is one;

π is a cyclic or linear conjugated polyolefinic ligand that provides 4 to 7 π electrons to the valence shell of M and has 4 to 7 carbon atoms, one of which is attached to the covalent bond or divalent group R^1, said π optionally being substituted by halogen and lower alkyl groups having 1 to 6 carbon atoms or by a fused benzo group;

M is a metal selected from chromium, molybdenum, tungsten, manganese, and iron;

X is a non-nucleophilic counterion;

e is zero or one, e being zero when the sum of electrons available from 3CO groups, the conjugated polyolefin and the metal is 18, and e being one when the sum is 19;

monomer 2 is an ethylenically-unsaturated monomer having at least one pendent nucleophilic group and being copolymerizable with monomer 1;

monomer 3 is an ethylenically-unsaturated monomer copolymerizable with monomers 1 and 2;

said nucleophilic groups being capable of displacing tetrahydrofuran from (cyclopentadienyl)(tetrahydrofuran)dicarbonyl manganese in solution in tetrahydrofuran at about 25° C. under nitrogen in less than one hour.

4,503,141

SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS CONTAINING COUPLERS WITH A HYDROXYL SUBSTITUTED AROMATIC HETEROCYCLIC SULFONYL GROUP IN THE BALLAST GROUP

Nobuo Furutachi, and Takeshi Hirose, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

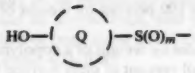
Filed Mar. 23, 1984, Ser. No. 592,485

Claims priority, application Japan, Mar. 28, 1983, 58-52924

Int. Cl.³ G03C 7/26, 7/34

U.S. Cl. 430—558 **9 Claims**

1. A silver halide color photographic light-sensitive material containing at least one coupler having a ballast group represented by the following general formula (I):



(I)

wherein

represents a substituted or unsubstituted aromatic heterocyclic ring, and m represents an integer of 1 or 2.

4,503,142

OPEN READING FRAME VECTORS

Michael L. Berman, Damascus; Thomas J. Silhavy, Middletown, and George M. Weinstock, Frederick, all of Md., assignors to Litton Bionetics, Inc., Kensington, Md.

Filed Jun. 25, 1982, Ser. No. 392,308

Int. Cl.[3] **C12P** *21/00, 21/02, 19/34;* **C12Q** *1/68, 1/00, 1/34;* **C12N** *15/00, 1/20, 1/00;* **C07H** *21/04*

U.S. Cl. 435—6 **15 Claims**

1. An open reading frame DNA vector having a promoter-translation start region, and adjacent thereto and downstream therefrom, a first coding segment having a start codon, a second coding segment coding for a detectable protein, and an insertion region between said first and second coding regions having no stop codons in frame with either the first or the second coding segment, and said insertion region having an insertion site and being of such length that the first and second coding segments are not in reading frame phase with each other.

4,503,143

ENZYME IMMUNOASSAY WITH TWO-PART SOLUTION OF TETRAMETHYLBENZIDINE AS CHROMOGEN

Bego Gerber, Belmont; Elliott Block, Wellesley Hills; Izak Bahar, Worcester; Walter D. Cantarow, Norwood; Mary Coseo, Arlington; Cheryl Eaton, Southboro; Wendy Jones, Sterling Junction; Patricia Kovac, Brookline, and John Bruins, Belmont, all of Mass., assignors to BTC Diagnostics Limited Partnership, Cambridge, Mass.

Filed Aug. 20, 1982, Ser. No. 410,157

Int. Cl.[3] **G01N** *33/54, 33/58, 33/74, 33/76*

U.S. Cl. 435—7 **16 Claims**

1. An enzyme immunoassay for the colorimetric detection of an antigen of the type wherein a quantity of a first antibody is adsorbed to a solid support; a conjugate is formed between an immunologic reagent and an enzyme; said conjugate is admixed with a sample to be tested for an antigen, said antigen binds to said first antibody and to said conjugate to form an immunologic complex in solid phase; and the quantity of said antigen is determined by measuring the reaction of said immunologic complex with a chromogenic substance responsive to said enzyme,

wherein the improvement comprises:

providing a first liquid solution comprising a tetramethylbenzidine and an organic solvent and a second liquid solution comprising a peroxide and buffer,

mixing said first and second liquid solutions to form an activated liquid solution of a tetramethylbenzidine approximately just prior to determination of antigen in said test sample, said activated liquid solution forming the chromogenic substance.

9. A diagnostic kit for carrying out an enzyme immunoassay of an analyte comprising the following separately contained components:

(a) a solid support precoated with a first antibody;

(b) a solution comprising a conjugate of an enzyme with a second antibody;

(c) a solution comprising a tetramethylbenzidine and a solvent; and

(d) a solution comprising a buffer and a peroxide.

4,503,144

METHOD AND COMPOSITION FOR THE DETERMINATION OF CHOLESTEROL

Rolf Deeg, Seeshaupt; Helmut Schlumberger, Polling, and Joachim Ziegenhorn, Starnberg, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany

Filed Dec. 7, 1981, Ser. No. 328,350

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1980, 3046241

Int. Cl.[3] **C12Q** *1/60, 1/44, 1/26, 1/28;* **C12R** *1/465*

U.S. Cl. 435—11 **18 Claims**

1. Method for the determination of cholesterol in free or bound form by utilizing cholesterol oxidase, which method comprises contacting a sample with cholesterol oxidase, determining cholesterol contained in the sample kinetically with the use of a cholesterol oxidase which has been obtained from a microorganism of the genus Streptomyces and with the addition of 3,4-dichlorophenol, and measuring the oxygen consumption, the hydrogen peroxide formed, or the cholestenone formed, as a measure of the cholesterol content of the sample said cholesterol oxidase and said 3,4-dichlorophenol being present in amounts sufficient to achieve a pseudo-first order reaction.

4,503,145

QUANTITATIVE ANALYSIS FILM

Harumi Katsuyama; Yoshikazu Amano, and Asaji Kondo, all of Asakashi, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

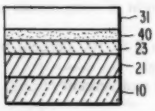
Filed Feb. 26, 1982, Ser. No. 352,970

Claims priority, application Japan, Feb. 27, 1981, 56-28159

The portion of the term of this patent subsequent to Oct. 23, 2001, has been disclaimed.

Int. Cl.[3] **G01N** *33/52;* **C12Q** *1/28, 1/52*

U.S. Cl. 435—16 **7 Claims**



1. An analysis film comprising a reagent layer containing a transaminase substrate composition, a pyruvic acid oxidase composition, a cationic dye-forming color indicator for detecting hydrogen peroxide, and an anionic polymer containing a sulfonate group capable of reacting with formed cationic dye to fix the formed dye.

4,503,146

METHOD FOR ELIMINATING TURBIDITY IN A BIOLOGICAL FLUID AND REAGENT THEREFOR

Shyun-long Yun, Tarrytown, N.Y.; Luis P. León, Fairfield, Conn., and Syed I. Ahmad, Orangeburg, N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

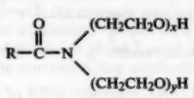
Continuation of Ser. No. 192,651, Oct. 1, 1980, abandoned. This application Apr. 5, 1983, Ser. No. 482,201

Int. Cl.[3] **C12Q** *1/44, 1/34, 1/60, 1/00*

U.S. Cl. 435—19 **31 Claims**

1. In an assay for a component in serum or plasma samples

comprising mixing sample with reagent and determining the amount of component therein, the improvement comprising a separate pretreatment step which includes adding the enzymes cholesterol esterase, lipase or mixtures thereof and at least one surfactant of the formula:



wherein R is alkyl or alkenyl containing from 5 to 17 carbon atoms; and x and y are whole number integers whose sum is no greater than 11 under conditions which permit sample clarification and wherein the amount of said enzyme and said surfactant when combined are sufficient to effectively clear turbidity from the untreated serum or plasma sample.

4,503,147

MONOMETHYLAMINE-OXIDIZING ENZYME

Motoo Nakajima; Kazuo Nakamura; Yoshio Shirokane, and Kiyoshi Mizusawa, all of Noda, Japan, assignors to Kikkoman Corporation, Noda, Japan

Filed Oct. 19, 1982, Ser. No. 435,316

Claims priority, application Japan, Oct. 22, 1981, 56-167910; Oct. 22, 1981, 56-167911

Int. Cl.[3] **C12Q** *1/26;* **C12N** *9/06;* **C12R** *1/05, 1/07*

U.S. Cl. 435—25 **14 Claims**

1. A monomethylamine-oxidizing enzyme characterized by the following phyical and chemical properties:

(a) having the ability to oxidatively deaminate the amino group of monomethylamine in the presence of water and oxygen to produce formaldehyde, ammonia and hydrogen peroxide;

(b) having high substrate specificity for, in order of descending relative activity, monomethylamine, ethylamine, and n-propylamine;

(c) having no substrate specificity for benzylamine, dimethylamine, trimethylamine, ethylenediamine and tyramine;

(d) having a Km value toward monomethylamine of 6.2×10^{-5} M at pH 9.0;

(e) having an optimum of pH range for enzymatic activity of pH 8 to 9 and a stable pH range of enzymatic activity in the range of pH 6 to 9;

(f) having optimum temperature ranges for enzymatic activity of (i) 40° to 50° C. at pH 7, and (ii) 30° to 40° C. at pH 9;

(g) being inactivated at pH 7 when treated for 10 minutes at 70° C. or higher;

(h) being inactivated at pH 9 when treated for 10 minutes at 63° C. or higher;

(i) being completely inactivated at 30° C. and pH 3.0 or below;

(j) being completely inactivated at 30° C. and pH 12 or higher,

(k) having its activity inhibited at pH 9 when treated for 10 minutes at 30° C. in the presence of any of the compounds—concentrations selected from the group consisting of KCN (5 mM), 8-oxyquinoline (5 mM), o-phenanthroline (5 mM), sodium diethyldithiocarbamte (5 mM), $HgCl_2$ (1 mM), p-chloromercuribenzoic acid (1 mM), monoiodoacetic acid (1 mM), iodacetamide (1 mM), and semicarbazide hydrochloride (1 mM);

(l) having its enzymatic activity stabilized by the addition of 2% (w/v) saccharose;

(m) being electrophoretically uniform when subjected to electrophoretic measurement using a polyacrylamide gel; and

(n) having a molecular weight of 320,000 as measured by gel filtration.

4,503,148

PROCESS FOR DETERMINING THE PH VALUE IN THE INTERIOR OF A CELL

Günter Valet, Gräfelfingerstrasse 79a, D-8000 München; Gerhard Ruhenstroth-Bauer, Spitzelbergerstrasse 11, D-8302 Gräfelfing; Erich Wünsch, Midgardstrasse 16, D-8132 Tutzing, and Luis Moroder, Lena-Christ-Strasse 12, D-8033 Martinsried, all of Fed. Rep. of Germany

Filed Feb. 5, 1982, Ser. No. 346,094

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1981, 3104078

Int. Cl.[3] **C12Q** *1/02, 1/00, 1/38, 1/44*

U.S. Cl. 435—29 **4 Claims**

1. A process for determining the pH value in the interior of a cell by measuring the emission of a fluorescent substance in said cell following incubation in a solution, which solution contains a compound of said fluorescent substance and the fluorescent substance is cleaved off in the cell by an enzyme present in the cell which process further comprises selecting as the fluorescent substance a substance such that the frequency of the emission maximum depends on the pH value, and employing as a compound of this fluorescent substance one which is membrane-penetrating, and determining the frequency at which the emission maximum of the fluorescence occurs.

4,503,149

METHOD OF MICROBIAL ASSAY

Phil A. Boyd, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Jun. 6, 1983, Ser. No. 501,480

Int. Cl.[3] **C12Q** *1/06, 1/08;* **G01N** *21/33*

U.S. Cl. 435—39 **5 Claims**

1. A method for determining the quantity of microorganisms in an aqueous specimen which contains microorganisms and multicellular organisms, the steps comprising:

(a) filtering said specimen to remove the multicellular organisms therefrom and recovering the filtrate containing the microorganisms;

(b) centrifuging said filtrate to concentrate the microorganisms in a pellet layer and removing supernatant fluid from said pellet layer;

(c) redispersing said pellet of the microorganisms in an aqueous solution having a volume less than the volume of said original specimen to provide an increased concentration of the microorganisms; and

(d) measuring the absorption of ultraviolet light by said aqueous solution at a wave length within the range of 260–280 nanometers, said absorption being directly proportional to the quantity of the microorganisms.

4,503,150

POLYURETHANE FOAM AND A MICROBIOLOGICAL METABOLIZING SYSTEM

Rocco P. Triolo, Broomall, Pa., assignor to Scotfoam Corporation, Eddystone, Pa.

Filed Nov. 2, 1983, Ser. No. 548,172

Int. Cl.[3] **C12P** *1/00;* **C12N** *11/04;* **C08G** *18/14*

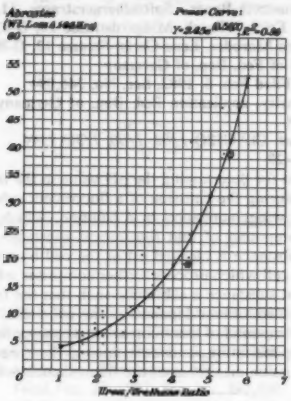
U.S. Cl. 435—41 **9 Claims**

1. A flexible, open cell, polyurethane foam having improved abrasion resistance produced by the process of reacting conventional polyurethane foam-forming chemicals including a polyol resin of a type suitable for making flexible polyurethane foam, an isocyanate and water in the presence of catalyst and a surfactant and in which the proportions of polyol, water and isocyanate reacted to produce said foam correspond to a urea to urethane ratio of less than about 5.

9. In an improved microbiological metabolic process which comprises agitating a generally cellular support structure for microbiological organisms in an aqueous medium containing microbiological organisms and nutrients for said organisms,

the improvement which comprising employing a cellular support structure having cells predominantly in the size

range of from 10 cells per inch to 100 cells per inch and being sufficiently open to readily permit flow of the aqueous medium into and out of the cells and said structure



comprising a flexible, abrasion-resistant reticulated polyurethane foam produced from a proportion of polyurethane foam forming reactants which provide a urea to urethane ratio of less than 5.

4,503,151

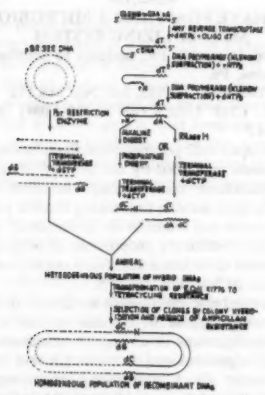
RECOMBINANT CDNA CONSTRUCTION METHOD AND HYBRID NUCLEOTIDES USEFUL IN CLONING

Gary V. Paddock, Mount Pleasant, S.C., assignor to Research Corporation, New York, N.Y.

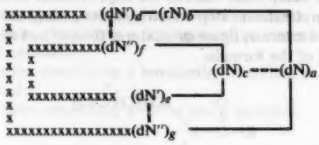
Division of Ser. No. 214,648, Dec. 10, 1980, Pat. No. 4,362,867. This application Nov. 22, 1982, Ser. No. 443,646

Int. Cl.[3] **C12P** *19/34, 21/00, 21/02;* **C12N** *15/00, 5/00, 5/02, 1/16, 1/18, 1/00, 1/20;* **C07H** *21/02, 21/04*

U.S. Cl. 435—68 **7 Claims**



1. A compound having the general formula:



wherein $(dN)_a$ and $(dN)_c$ represent series of deoxyribonucleotides, $(dN')_d$, $(dN')_e$, $(dN'')_f$ and $(dN'')_g$ represent series of identical deoxyribonucleotides, the series $(dN')_d$ being complementary to the series $(dN'')_f$ and the series $(dN')_e$ being complementary to the series $(dN'')_g$ and $(rN)_b$ represents a series of ribonucleotides; wherein a, b, c, d, e, f, and g are numbers of nucleotides in the series, provided that b is ≧1, a is ≧35, and c, d, e, f, and g are ≧10; wherein the series of deoxyribonucleotides $(dN)_a$ includes a series of deoxyribonucleotides which is substantially complementary to the series of deoxyribonucleotides $(dN)_c$; wherein the xxx-lines represent double-stranded DNA derived from a cloning vehicle, wherein the dotted lines may be either no bonds or covalent bonds; wherein the dashed lines represent non-covalent bonding between the complementary deoxyribonucleotide series; and wherein the solid lines represent covalent phosphodiester bonds.

4,503,152

PROCESS FOR PREPARING ANTIBIOTIC AM-2604-A

Satoshi Omura, and Hideki Shimizu, both of Tokyo, Japan, assignors to The Kitasato Institute, Japan

Filed Jan. 21, 1983, Ser. No. 459,912

Claims priority, application Japan, Jan. 21, 1982, 58-6756

Int. Cl.[3] **C12P** *17/16, 1/06;* **C12R** *1/465*

U.S. Cl. 435—118 **1 Claim**

1. A process for producing an antibiotic AM-2604-A substance having the following properties:

(a) Molecular formula: $C_{48}H_{71}NO_{14}$;

(b) Optical rotation: $[\alpha]_D^{27.5} = +240°$ (C=0.02, methanol);

(c) Melting point: 204° to 205° C.;

(d) Ultraviolet absorption spectrum: as shown in FIG. 1;

(e) Infrared absorption spectrum as shown in FIG. 2;

(f) Proton nuclear magnetic resonance spectrum as shown in FIG. 3;

(g) ^{13}C Nuclear magnetic resonance spectrum as shown in FIG. 4; and

(h) Soluble in chloroform, acetone, and ethyl acetate, sparingly soluble in lower alcohols, and insoluble in n-hexane and water

said process comprises cultivating an antibiotic AM-2604-A substance-producing strain belonging to the genus Streptomyces in a nutrient medium under aerated conditions until a substantial amount of said antibiotic AM-2604-A substance is accumulated, and recovering the antibiotic AM-2604-A substance from the culture broth wherein said strain in Steptomyces sp. AM-2604 having FERM BP-234.

4,503,153

METHOD FOR PRODUCING ALDEHYDES FROM PRIMARY ALCOHOLS

John Geigert, Clayton, and Saul L. Neidleman, Oakland, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 362,746, Mar. 29, 1982, abandoned. This application Jan. 16, 1984, Ser. No. 570,790

Int. Cl.[3] **C12P** *7/24*

U.S. Cl. 435—147 **8 Claims**

1. A method of making an aldehyde of formula R_1 CHO from a primary alcohol of formula R_1CH_2OH, wherein R_1 is selected from the group consisting of

(i) $R_2CH{=}CH(CH_2)_n-$,

(ii) $R_2C{=}C(CH_2)_n-$, and

(iii) $R_3(CH_2)_n-$,

wherein n is O or 1; R_2 is hydrogen, methyl, ethyl, n-propyl, isopropyl, hydroxymethyl, hydroxyethyl or R_4; R_3 is 2-pyridyl, 3 -pyridyl, 4-pyridyl, 2-furyl, 3-furyl or R_4; and R_4 is phenyl optionally substituted at any one position with methyl; provided that, if R_2 is hydroxymethyl, n is O, which comprises reacting, in an aqueous medium, chloroperoxidase from *Caldariomyces fumago* with the primary alcohol in the presence of an oxidizing agent at ambient temperature and pressure and with a pH range of about 3 to about 7, until the primary alcohol is converted to the corresponding aldehyde.

4,503,154

ANAEROBIC DIGESTION OF ORGANIC WASTE FOR BIOGAS PRODUCTION

Robert Paton, Ponce, P.R., assignor to Biorganic Energy, Inc., Hato Rey, P.R.

Continuation-in-part of Ser. No. 337,250, Jan. 5, 1982, Pat. No. 4,429,043. This application Sep. 29, 1983, Ser. No. 536,431
The portion of the term of this patent subsequent to Oct. 21, 1997, has been disclosed.
Int. Cl.³ C12P *5/02*
U.S. Cl. 435—167 **19 Claims**

1. An anaerobic bacterial process for converting organic waste material selected from the group consisting of straw, alcohol stillage, paper, vegetable refuse and animal waste into methane and fertilizer, the combination of steps consisting essentially of:

passing a low solids aqueous suspension of said organic waste having a solids content of less than about 4% by weight into the first of at least four anaerobic zones, the first and second anaerobic zones being located in one tank and the third and fourth anaerobic zones being located in a second tank, the second zone having a liquid space about one half the liquid space of the first zone, said zones being arranged for liquid communication in series such that addition of liquid to the first zone causes;

liquid flow from the lower portion of the first anaerobic zone to the lower portion of the second anaerobic zone;

liquid flow from the upper portion of the second anaerobic zone to the upper portion of the third anaerobic zone;

liquid flow from the lower portion of the third anaerobic zone to the lower portion of the fourth anaerobic zone;

liquid flow out of the upper portion of the last anaerobic zone;

said serial liquid communication being the only liquid communication between zones, there being no passing of the settled solids from the second anaerobic zone to the third anaerobic zone,

maintaining quiescent conditions in each of said anaerobic zones whereby a three layer stratification of the mixture occurs,

maintaining ambient temperature of up to about 40° C. in each of said zones; and

collecting methane from the top of said zones and periodically removing fertilizer solids from a lower portion of said zones.

4,503,155

MULTIFUNCTIONAL, CLONING VECTORS FOR USE IN STREPTOMYCES, BACILLUS, AND *E. COLI*

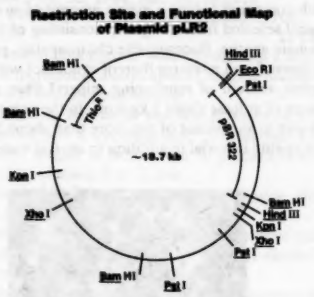
James R. Miller; Jeffrey T. Fayerman; Steven Kovacevic, and Nancy E. Beerman, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 1, 1982, Ser. No. 344,710
Int. Cl.³ C12N *15/00, 1/20, 1/00*
U.S. Cl. 435—172.3 **52 Claims**

1. A multifunctional recombinant DNA cloning vector comprising:

(a) two or more functionally different origins of replication that are independently selected from the group consisting of any origin of replication that is functional in Streptomyces, any origin of replication that is functional in Bacillus, and any origin of replication that is functional in *E. coli*, and .

(b) one or more DNA segments that confer resistance to at least one antibiotic when transformed into a sensitive host cell in which an origin of replication comprising said



vector is functional, said host cells being susceptible to transformation, cell division, and culture,

subject to the limitatidn that when said vector is limited to two functionally different origins of replication, neither of the origins of replication is functional in *E. coli*.

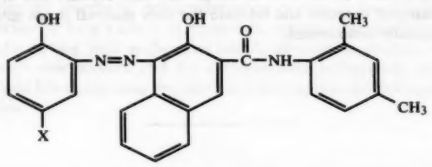
4,503,156

REAGENT MIXTURE FOR MEASURING MAGNESIUM

Fujio Yamazato, Tokyo; Kuniaki Tokuda, Kawagoe, and Toshihiko Oda, Kyoto, all of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 27, 1982, Ser. No. 424,180
Claims priority, application Japan, Sep. 28, 1981, 56-153329
Int. Cl.³ G01N *21/78, 33/52*
U.S. Cl. 436—79 **9 Claims**

1. In a reagent mixture for measuring magnesium containing a color producing reagent of the formula:



wherein X is SO_3H, SO_3Na or H, the improvement wherein the reagent mixture includes a stabilizer for the color producing reagent of at least one of sulfide compounds and thioureide compounds in an effective amount to stabilize the color producing reagent.

4,503,157

SINTERED APATITE BODIES AND COMPOSITES THEREOF

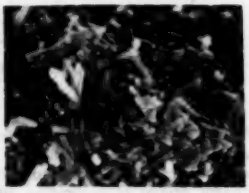
Seiichi Hatahira, Handa, Japan, assignor to Ina Seito Co., Ltd., Tokoname, Japan

Filed Apr. 28, 1983, Ser. No. 489,520
Claims priority, application Japan, Sep. 25, 1982, 57-167013; Oct. 30, 1982, 57-191347
Int. Cl.³ C04B *35/00*
U.S. Cl. 501—1 **25 Claims**

1. A process for producing a sintered apatite body, which comprises baking an apatite powder material selected from the group consisting of hydroxyapatite, carbonate apatite, fluoroapatite, chloroapatite, precursor materials thereof, the mixtures thereof, in the presence of co-existing water in an

amount of not more than about 25% by weight of the apatite material in addition to crystal water, under pressure of at least about 5 kg/cm^2 at a temperature of not higher than about 800° C. to substantially sinter the apatite material, the crystals of the sintered apatite having fine dense crystalline structures comprising needle-like fine crystals entangled together.

7. A process for producing a sintered apatite composite, which comprises baking a matrix amount of an apatite powder material selected from the group consisting of hydroxyapatite, carbonate apatite, fluoroapatite chloroapatite, precursor materials thereof, and mixtures thereof in contact with a reinforcing effective amount of reinforcing mineral fiber material under pressure of at least about 5 kg/cm^2, in the presence of coexisting water in an amount of not more than about 25% by weight of the apatite material in addition to crystal water, at a temperature not higher than about 800° C. to substantially sinter the apatite material and lower than the temperature causing substantial deterioration of the fiber material, the crystals of the sintered apatite having fine dense crystalline structures comprising needle-like fine crystals entangled together.



14. A sintered apatite-mineral fiber material composite which consists essentially of an effective amount of a reinforcing mineral fiber material and a matrix amount of sintered apatite in contact with the fiber material, said apatite being selected from hydroxyapatite, carbonate apatite, fluoroapatite, chloroapatite and mixtures thereof, wherein the crystals of the sintered apatite have fine dense crystalline structures comprising at least about 30% of needle-like fine crystals and are entangled together and wherein the fiber material is not substantially deteriorated.

4,503,158

DOUBLE OR MIXED SILICATES OF ALKALI METAL AND OTHER GLASS MODIFIER METAL(S) USED TO PREPARE GLASS COMPOSITIONS

Christian Richard, Clamecy, France, assignor to Rhone-Poulenc Industries, Paris, France

Continuation-in-part of Ser. No. 281,913, Jul. 9, 1981, abandoned. This application Apr. 13, 1983, Ser. No. 484,581

Claims priority, application France, Jul. 11, 1980, 80 15460; Feb. 11, 1981, 81 02640

Int. Cl.^{3} C03C *1/00*

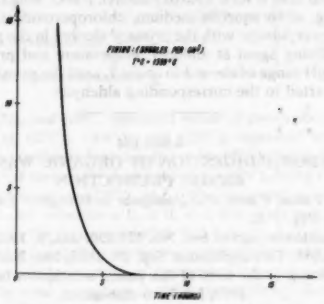
U.S. Cl. 501—27 **15 Claims**

1. In a process for the preparation of an at least double silicate of an alkali metal and at least one other metal, said process comprising interreacting:

(i) an aqueous solution an alkali metal silicate which is alkaline and comprises a glass forming oxide and

(ii) a solution of an oxide of such at least one other metal, or salt thereof, which is acidic and comprises a glass modifying oxide,

the improvement which comprises effecting said interreacting directly and rapidly with agitation in the presence of



(iii) a water-miscible polar organic liquid, whereby said at least double silicate is suspended in the organic reaction medium in insoluble and finely divided form.

4,503,159

POLYOLEFIN POLYMERIZATION PROCESS AND CATALYST

Albert P. Masino; Kiplin D. Cowan, both of Bartlesville, and Gil R. Hawley, Dewey, all of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 19, 1983, Ser. No. 524,488

Int. Cl.^{3} C08F *4/64*

U.S. Cl. 502—111 **14 Claims**

1. A process for preparing an olefin polymerization catalyst comprising mixing a magnesium dihalide and a small quantity of added water in a hydrocarbon solvent in the presence of a phase transfer agent and reacting the resulting hydrated magnesium dihalide with reactants comprising a benzoic acid ester and an alkoxytitanium compound to form a first catalyst component, and then reacting said first catalyst component with an organoaluminum halide to form a solid product, then reacting said solid product with a halogenating agent comprising a titanium halide, wherein the amount of added water employed is such that the total moles of water including water originally associated with the magnesium dihalide is in the range of 0.5 to 1.5 times the number of moles of magnesium dihalide.

4,503,160

HYDROSILYLATION METHOD, CATALYST AND METHOD FOR MAKING

Robert E. Williams, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

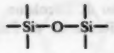
Filed Aug. 29, 1983, Ser. No. 527,538

Int. Cl.^{3} B01J *31/12, 31/30;* C08G *77/06;* C07F *7/08*

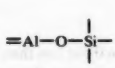
U.S. Cl. 502—158 **9 Claims**

1. A hydrosilylation catalyst comprising a hydroxylated oxide of silicon or aluminum having from 0.1 to 1% by weight of chemically combined platinum atoms, which hydroxylated oxide of silicon or aluminum is derivatized with a plurality of

groups attached to the surface hydroxylated oxide of silicon or aluminum by



linkages, or



linkages, respectively, as the result of reacting said hydroxylated oxide with a mercaptoorganoalkoxysilane and the platinum atoms are chemically combined to the surface of the hydroxylated oxide of silicon or aluminum through the derivatized groups by Pt—S linkages, where R is a divalent $C_{(2-13)}$organo radical.

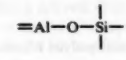
5. A method for making a platinum catalyst comprising

(A) effecting reaction under conditions to provide the azeotropic removal of water and alcohol between an hydroxylated oxide of silicon or aluminum having a surface area of about 100 to about 800 square meters per gram and mercapto organo alkoxy silane of the formula,

$$(R^1O)_3Si—R—SH \quad (1)$$

to produce a functionalized hydroxylated oxide of silicon or aluminum having a plurality of chemically combined mercapto organosiloxy groups attached to the surface of the hydroxylated oxide of silicon or aluminum by

linkages, or



linkages, respectively,

(B) drying the resulting functionalized oxide of silicon or aluminum of (A),

(C) effecting reaction under substantially anhydrous conditions between the functionalized oxide of silicon or aluminum of (B) and a platinum halide where there is utilized sufficient platinum halide to produce a catalyst composition having about 0.1% to 1 by weight of chemically combined platinum atoms and

(D) recovering the resulting platinum catalyst from the mixture of (C)

where R is a divalent $C_{(2-13)}$organo radical and R^1 is a $C_{(1-8)}$alkyl radical.

8. A method in accordance with claim 5, where the alkoxyorganomercaptan is γ-mercaptopropyltrimethoxysilane.

4,503,161

LATENT LEWIS ACID CATALYST ENCAPSULATED WITHIN POLYMERIZED CYCLOALIPHATIC EPOXIDE AND POLYHYDRIC ALCOHOL

Gerald E. Korbel, Little Canada, and Richard G. Newell, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Mar. 23, 1984, Ser. No. 592,578

Int. Cl.[3] **C08G** *59/72, 59/68, 65/28;* **B01J** *31/06*

U.S. Cl. 502—159 **21 Claims**

1. A latent catalyst concentrate which comprises a slurry of

A. rupturable, impermeable microcapsules ranging in size from about 0.1 to 400 micrometers having

(1) shell walls of an interfacial reaction product of a polyhydric alcohol and a cycloaliphatic polyepoxide having an equivalent weight of from about 70 to 220 and a functionality of from about 2 to 3, and

(2) liquid fills comprising a Lewis acid-polyhydric alcohol complex in

B. a liquid medium selected from esters of an aromatic carboxylic acid and an alkyl, aralkyl, aryl, or alkenyl alcohol, the ester containing up to about 40 carbon atoms.

11. Rupturable, impermeable microcapsules ranging in size from about 0.1 to 400 micrometers having

(1) shell walls of an interfacial reaction product of a polyhydric alcohol and a cycloaliphatic polyepoxide having an equivalent weight from about 70 to 220 and a functionality of from about 2 to 3, and

(2) liquid fills comprising a Lewis acid-polyhydric alcohol complex.

17. A method for the preparation of a latent catalyst concentrate which comprises

(a) dispersing and maintaining discrete droplets of a complex of a Lewis acid with polyhydric alcohol in a liquid medium selected from esters of an aromatic carboxylic acid and an alkyl, aralkyl, aryl, or alkenyl alcohol, the ester containing up to about 40 carbon atoms, and

(b) adding to said liquid medium a composition comprising a cycloaliphatic polyepoxide having an equivalent weight of from about 70 to 220 and a functionality of from about 2 to 3,

whereby interfacial polycondensation occurs at the droplet surface to form a slurry of rupturable, impermeable microcapsules having shell walls of an interfacial reaction product of polyhydric alcohol and the cycloaliphatic polyepoxide and liquid fills comprising the Lewis acid-polyhydric alcohol complex.

4,503,162

CATALYST SYSTEMS FOR THE CONVERSION OF GASES

Hassan Windawi, Arlington Heights; Gene R. Grieger, Rolling Meadows, and Warren R. Oakdale, Morton Grove, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 498,624, May 27, 1983, abandoned. This application Mar. 21, 1984, Ser. No. 591,731

Int. Cl.[3] **B01J** *21/04, 23/72, 23/78, 23/84*

U.S. Cl. 502—174 **11 Claims**

1. A catalyst system for the conversion of gases into useable products which comprises an iron-containing compound admixed with elemental copper and aluminum-, potassium- and vanadium-containing compounds.

4,503,163

CATALYSTS FOR PARA-ETHYLTOLUENE DEHYDROGENATION

Chin-Chiun Chu, North Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 15, 1982, Ser. No. 449,907
Int. Cl.³ B01J *23/78, 23/86*
U.S. Cl. 502—183 **4 Claims**

1. In a dehydrogenation catalyst composition comprising the following components:

(a) from about 35% to 55% by weight of iron oxide, calculated as ferric oxide;

(b) from about 27% to 41% by weight of a potassium compound, calculated as potassium oxide; and

(c) from about 0% to 5% of a chromium compound, calculated as chromic oxide,

the improvement comprising combining with said components (a), (b) and (c) a modifying component (d), said modifying component (d) being capable of enhancing selectivity of production of p-methylstyrene when said catalyst composition is used to promote the preferential formation of para-methylstyrene from para-ethyltoluene, said modifying component (d) being a calcium compound, said calcium compound being present to the extent of from about 2% to 10% by weight of said catalyst composition, calculated as calcium oxide.

4,503,164

ZEOLITE-TYPE CATALYST AND PROCESS FOR PREPARING SAME

Haruhito Sato, Sodegaura, Japan, assignor to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Dec. 16, 1983, Ser. No. 562,440
Claims priority, application Japan, Dec. 27, 1982, 57-226551
Int. Cl.³ B01J *21/02, 21/08*
U.S. Cl. 502—202 **7 Claims**

1. A zeolite-type catalyst having a double structure which comprises a core made of crystalline borosilicate and a shell made of crystalline silicon oxide.

4,503,165

CUPREOUS CATALYST AND PROCESS FOR MAKING SAME

Don H. Hashiguchi, University Heights; Ronald J. Dietrich, Strongsville, both of Ohio, and George P. Schoepe, Raleigh, N.C., assignors to SCM Corporation, New York, N.Y.

Filed Apr. 9, 1984, Ser. No. 597,853
Int. Cl.³ B01J *21/04, 23/06, 23/72, 23/74*
U.S. Cl. 502—225 **10 Claims**

1. In a process for making catalyst from cupreous particulates containing a major proportion of cuprous and cupric oxides and a minor proportion of elemental copper wherein a grind charge of said particulates having average particle size about 15 microns and containing up to about 10% of promoter-providing material selected from the elements aluminum, zinc and iron, the oxides of aluminum, zinc and iron, the chlorides of aluminum, zinc, copper and iron, silica, aluminosilicates, and or below 0.05% antimony promoter is subjected to high energy comminution until the average particle size of the resulting grind is no larger than 15 microns, the improvement which comprises including in said charge about 0.05–5% of an hydroxide of Period IV metal having Atomic Number between 24 and 30.

4,503,166

CATION-REORDERED, BISMUTH-CONTAINING PEROVSKITES

Robert A. Beyerlein, Westfield; Kenneth R. Poeppelmeier, Flemington, and Allan J. Jacobson, Princeton, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Apr. 16, 1984, Ser. No. 601,076
Int. Cl.³ B01J *23/02*
U.S. Cl. 502—303 **16 Claims**

1. A cation-reordered, bismuth-containing compound having a perovskite-type structure of the formula:

$$Ba_2La_yBi_{2-y}O_6$$

wherein y is greater than 0 but less than 1, the compound being further characterized by having the x-ray powder diffraction pattern indicated in Table II.

4,503,167

METHOD FOR URETHANE-MODIFIED ISOCYANURATE FOAMS

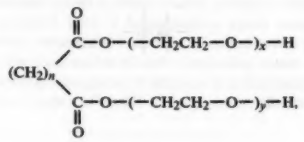
Kenneth B. White, Lisle, Ill., assignor to Akzona Incorporated, Enka, N.C.

Continuation-in-part of Ser. No. 519,576, Aug. 2, 1983, abandoned. This application Mar. 21, 1984, Ser. No. 592,304
Int. Cl.³ C08G *18/14, 18/16, 18/34*
U.S. Cl. 521—105 **29 Claims**

1. A method for the manufacture of urethane-modified polyisocyanurate foams, comprising blending and reacting an isocyanate with a "B" side, said "B" side comprising a polyol blend, a surfactant, and a blowing agent, said polyol blend comprising:

(a) at least 5% (wt.) of a mixture of a polyalkoxylated amine and a polyalkoxylated quaternary ammonium borate ester, the weight ratio of said polyalkoxylated amine to said polyalkoxylated quaternary ammonium borate ester being from 1:0.005 and 1:12;

(b) at least 45% (wt.) of a resin polyol, said resin polyol comprising



wherein n is an integer between 1 and 4 inclusive and x and y are integers each having a value of between 2 and 20, inclusive; and

(c) the remainder of said polyol blend being a polyether or polyester polyol.

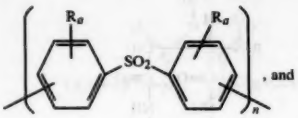
4,503,168

COOKWARE MADE FROM POLYARYLETHERSULFONE

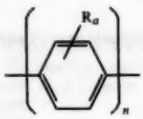
Tyler F. Hartsing, Jr., Westfield, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

Filed May 25, 1983, Ser. No. 498,049
Int. Cl.³ C08G *65/48, 75/23;* C08K *3/26, 3/10*
U.S. Cl. 523—100 **46 Claims**

1. Cookware formed from a molding composition comprising a polyarylether sulfone having a reduced viscosity of from about 0.4 to greater than about 2.5 g/100 ml as measured in N-methylprolidone at 25° C., containing units of the following formula:

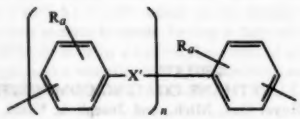


(I)



(II)

and/or



(III)

where R is independently hydrogen, C_1 to C_6 alkyl or C_4 to C_8 cycloalkyl, X' is independently

wherein R_1 and R_2 are independently hydrogen or C_1 to C_9 alkyl, or

wherein R_3 and R_4 are independently hydrogen or C_1 to C_8 alkyl, and a_1 is an integer of 3 to 8; —S—, —O—, or

a is an integer of 0 to 4 and n is independently an integer of 1 to 3 and wherein the ratio of unit (I) is the sum of units (II) and/or (III) is greater than 1, wherein the units are attached to each other by an —O— bond.

4,503,169

RADIOPAQUE, LOW VISUAL OPACITY DENTAL COMPOSITES CONTAINING NON-VITREOUS MICROPARTICLES

Ronald M. Randklev, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 19, 1984, Ser. No. 602,114
Int. Cl.³ A61K *6/08*; C08K *3/36*; C08L *35/02*
U.S. Cl. 523—117 **20 Claims**

1. Radiopaque dental composite, comprising a mixture of:

(a) polymerizable resin suitable for use in the oral environment, and

(b) non-vitreous microparticles, said microparticles individually comprising:

(i) a plurality of amorphous microregions comprising oxide of silicon, substantially uniformly interspersed with

(ii) a plurality of crystalline microregions comprising radiopacifying polycrystalline ceramic metal oxide,

said microparticles being substantially free of visually opacifying inclusions.

14. Non-vitreous microparticles having a diameter less than about 50 micrometers, said microparticles individually comprising:

(a) a plurality of amorphous microregions comprising oxide of silicon, substantially uniformly interspersed with

(b) a plurality of crystalline microregions comprising radiopacifying polycrystalline ceramic metal oxide,

said microparticles being substantially free of visually opacifying inclusions.

4,503,170

SHEAR THICKENING FLUID

Evelyn N. Drake, Plainfield, N.J.; Mary E. Morrison, and Charles R. Dawson, both of Houston, Tex., assignors to Exxon Production Research Co., Houston, Tex.

Continuation-in-part of Ser. No. 79,436, Sep. 27, 1979, abandoned. This application Jul. 21, 1982, Ser. No. 400,526
Int. Cl.³ C08L *3/34, 5/01*; C08K *7/00, 3/34*
U.S. Cl. 523—130 **33 Claims**

1. A well-control shear thickening composite comprising (1) water swellable clay granules capable of rapidly forming a high strength paste when brought into contact with water, (2) a hydrophobic phase comprising oil and a surfactant and (3) an aqueous phase comprising water and a water soluble polymer wherein the clay granules, present in sufficient quantity so as to form a paste having a strength of at least 2000 lb/100 ft^2, are suspended in the hydrophobic phase as discrete particles, and the aqueous phase is also suspended as discrete droplets in the hydrophobic phase, the hydrophobic continuous phase maintaining the water swellable clay granules and aqueous phase droplets separated during low shear pumping of the composite, the clay granules fragmenting during the application of high shear to the shear-thickening composite causing the aqueous phase to contact the fragmented clay granules to form said paste.

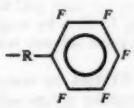
4,503,171

GRAPHITE REINFORCED PERFLUOROELASTOMER

Charles W. Stewart, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 11, 1984, Ser. No. 569,975
Int. Cl.³ C08K *9/04, 3/04*
U.S. Cl. 523—215 **4 Claims**

1. A solid, particulate filler selected from the group consisting of carbon black and graphite having chemically bonded thereto reactive sites of the general formula



wherein R is selected from the group consisting of a divalent bond, $—CH_2—$ and $—CH_2CH_2—$.

4,503,172

WATER SOLUBLE POLYMERS

David Farrar, Bradford, and Malcolm Hawe, Huddersfield, both of England, assignors to Allied Colloids Limited, Bradford, England

Filed May 21, 1984, Ser. No. 612,185

Claims priority, application United Kingdom, May 20, 1983, 8313976; Aug. 12, 1983, 8321731

Int. Cl.³ C08F 6/04, 6/10

U.S. Cl. 523—336 10 Claims

1. A process in which a solution in a blend of water and a polar solvent of a water soluble polymer containing neutralised acid groups, derived from monomers comprising acidic monomers selected from acrylic acid and 2-acrylamido-2-methyl propane sulphonic acid, is separated into an aqueous phase containing a higher molecular weight fraction and an organic phase containing a lower molecular weight fraction and in which the polar solvent is a C_1 to C_5 alcohol, the acid groups are neutralised with a cation selected from sodium, potassium, lithium or ammonium and the molar proportion of neutralised groups is from 10 to 55% when the cation is selected from sodium and potassium, 10 to 70% when the cation is ammonium and 30 to 90% when the cation is lithium.

4,503,173

SELF-CURING WATER DISPERSED POLYMER BLENDS

Phillip C. Martino, Brunswick, and Peter P. Winner, North Royalton, both of Ohio, assignors to SCM Corporation, New York, N.Y.

Filed Dec. 19, 1983, Ser. No. 563,126

Int. Cl.³ C08L 63/00

U.S. Cl. 523—407 21 Claims

1. A water dispersed coating composition comprising:

a self-curing water dispersed copolymer produced by in-situ copolymerization of monomers in water in the presence of an epoxy phosphate, said copolymer comprising polymerized ethylenically unsaturated monomers including between 1% and 20% alkylol acrylamide monomer, between 1% and 20% reactive functional monomer selected from carboxyl, hydroxyl, amine or amide functional monomer, and the balance of monomer being other ethylenic monomers, said ethylenically unsaturated monomers copolymerized in water in the presence of 0.1% to 20% epoxy phosphate additive based on the weight of monomers copolymerized.

14. A process for producing a water dispersed copolymer for use in a coating composition, the process comprising:

copolymerizing ethylenically unsaturated monomers, including between 1% and 20% by weight alkylol acrylamide monomer and between 1% and 20% by weight reactive functional monomer, the balance being other ethylenic monomers, the copolymerization being in an aqueous medium in the presence of 0.1 to 20% epoxy phosphate additive to produce a stable water dispersed self-curing polymer.

4,503,174

LOW TEMPERATURE CURING COATING COMPOSITION

Joseph A. Vasta, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 6, 1983, Ser. No. 529,621

Int. Cl.³ C08K 5/54; C08L 63/00

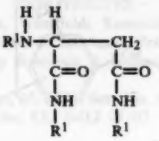
U.S. Cl. 523—439 17 Claims

1. A coating composition comprising 10–80% by weight of binder and 20–90% by weight of an organic solvent; wherein the binder consists essentially of

(1) an acrylic polymer containing 0.1–10% by weight of polymerized monomers having reactive groups selected from the group consisting of acrylamide, methacrylamide, methacrylic acid, acrylic acid and glycidyl methacrylate,

(2) an epoxy resin,

(3) a polyamine curing agent of the formula



where R^1 is R^2NH_2 and R^2 is an aliphatic or cycloaliphatic radical

(4) phenol and

(5) a bicyclic amidine.

4,503,175

ACRYLIC POLYURETHANE COATING COMPOSITION

Eric C. Houze, Royal Oak, Mich., and Joseph A. Vasta, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

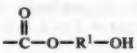
Filed Dec. 19, 1983, Ser. No. 562,815

Int. Cl.³ C08G 18/62, 18/79

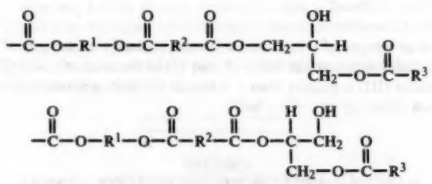
U.S. Cl. 524—39 19 Claims

1. A coating composition having a binder solids content of 5–75% by weight and 95–25% by weight of an organic liquid; wherein the binder consists essentially of about

(1) 50–95% by weight, based on the weight of the binder, of an acrylic polymer having a backbone of polymerized monomers selected from the group consisting of alkyl methacrylate, alkyl acrylate each having 1–12 carbon atoms in the alkyl group, styrene or mixtures thereof and having polymerized ethylenically unsaturated ester monomers that form ester groups A and B pending from the carbon atoms of the polymer backbone and comprise about 10 to 75% of the total weight of the acrylic polymer and the ester groups consisting essentially of ester group (A)



and ester group (B) selected from the group consisting of



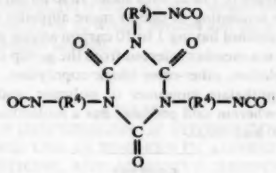
or mixtures thereof, wherein the molar ratio of ester group (A) to ester (B) is from about 1:1.5 to 1:2.5; and wherein

R^1 is a saturated hydrocarbon group having 2–4 carbon atoms,

R^2 is phenylene,

R^3 is a tertiary hydrocarbon group having 8 through 10 carbon atoms; and

(2) 5–50% by weight, based on the weight of the binder, of a polyisocyanate consisting of a polyisocyanate of the formula



where R^4 is a hexylene group.

8. The coating composition of claim 1 containing in addition pigment in a pigment to binder ratio of about 0.1/100 to 100/100.

9. The coating composition of claim 8 in which the pigment contains metallic flake pigments.

10. The coating composition of claim 9 containing in addition 1–15% by weight, based on the weight of the binder, of cellulose acetate butyrate having a butyryl content of about 50–60% by weight, a hydroxyl content of about 1.0–3.0% by weight, and a viscosity of 0.02–5.0 seconds measured at 25° C. according to ASTM D-1343-56.

4,503,176

PROCESS FOR THE MANUFACTURE OF A CUTBACK OF A MIXTURE OF BITUMEN AND RUBBER

Peter L. Barlow, Sutton, and Kenneth M. Riches, Northwich, both of England, assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 3, 1983, Ser. No. 454,939

Claims priority, application United Kingdom, Jan. 11, 1982, 8200708

Int. Cl.³ C08L *7/00, 9/00, 53/02, 95/00*

U.S. Cl. 524—62 **7 Claims**

1. A process for the manufacture of a cutback of a mixture of bitumen and an unsaturated rubber comprising treating a mixture of bitumen and between 1 and 25% by weight of the bitumen/rubber blend of rubber which has been thoroughly mixed at between 120° C. and 240° C. with between 0.5% and 5% by weight of the bitumen/unsaturated rubber blend of a free radical generator at a temperature of between about 100° and 240° C. and then mixing with between about 5% and 30%w, based on the obtained mixture, of a volatile petroleum oil fraction solvent.

4,503,177

STABILIZATION OF PHOTOCHROMIC COMPOUNDS, AND THE USE OF STABILIZED PHOTOCHROMIC COMPOUNDS

Paul I. Reid, St. Austell, and Brian R. Waters, Par, both of England, assignors to English Clays Lovering Pochin & Co., Ltd., St. Austell, England

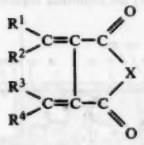
Filed Jul. 6, 1982, Ser. No. 395,700

Claims priority, application United Kingdom, Jul. 16, 1981, 8121910; Sep. 7, 1981, 8127042; May 14, 1982, 8214167

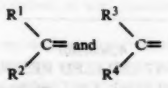
Int. Cl.³ C09D *11/00;* **C09K** *5/34*

U.S. Cl. 524—87 **9 Claims**

1. In association, a selected photochromic compound and, as a stabilizer for that compound in a higher-energy coloured form, a clay mineral having an expanding crystal lattice, the selected photochromic compound being a fulgide or fulgimide and having the following general formula:



where X is >O or >N—R; R is a hydrogen atom or an alkyl, aryl or aralkyl group; and each of R^1, R^2, R^3 and R^4, which may be the same or different, is a hydrogen atom or an alkyl, aryl or heterocyclic group, provided that not more than one of R^1 and R^2 is a hydrogen atom and not more than one of R^3 and R^4 is a hydrogen atom, or one but not both of the groups



represents an admantylidene group.

4,503,178

CYCLIC PHOSPHINE OXIDES AND THEIR USE AS FLAME RETARDANTS IN STYRENE MODIFIED POLYPHENYLENE ETHER RESINS

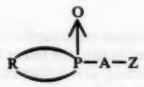
Joseph Green, East Brunswick, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Apr. 26, 1984, Ser. No. 604,254

Int. Cl.³ C08K *5/53;* **C07D** *105/02*

U.S. Cl. 524—116 **18 Claims**

1. A cyclic phosphine oxide composition containing the grouping:



wherein P is phosphorus, O is oxygen, A is an alkylene chain of 2 to 12 carbon atoms, Z is a polar group and R represents the carbon atoms in a phosphorus-containing ring formed by alkylating an ethylenically unsaturated cyclic hydrocarbon with phosphine.

4,503,179

AQUEOUS FLUORINE-CONTAINING RUBBER COATING COMPOSITION AND ARTICLE COATED THEREWITH

Tatsushiro Yoshimura; Tsutomu Terada, both of Takatsuki, and Shozo Nakayama, Kariya, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka and Kabushikikaisha Tyoda Jidoshokki Seisakusho, Aichi, both of, Japan

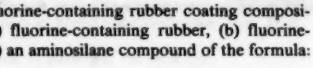
Filed Feb. 12, 1982, Ser. No. 348,370

Claims priority, application Japan, Feb. 13, 1981, 56-20414

Int. Cl.³ C08K *5/54*

U.S. Cl. 524—262 **20 Claims**

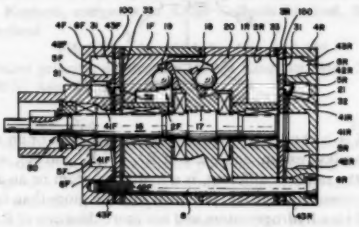
1. An aqueous fluorine-containing rubber coating composition comprising (a) fluorine-containing rubber, (b) fluorine-containing resin, (c) an aminosilane compound of the formula:



(I)

wherein R is methyl or ethyl; X is a single bond or —$(CH_2$-

)$_2$—NH—, —CONH— or —(CH$_2$)$_2$—NH—(CH$_2$)$_2$—NH—; and n is 2 or 3, and (d) an aqueous liquid vehicle, the weight



ratio of the component (a) and the component (b) being from 95:5 to 35:65.

4,503,180

UV-STABILIZED RESINS

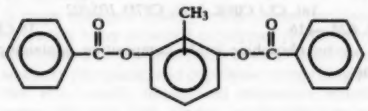
Ta-Yen Ching, Walnut Creek, Calif., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 234,228, Feb. 13, 1981, abandoned. This application Jun. 10, 1982, Ser. No. 387,107

Int. Cl.^{3} C08K *5/10*

U.S. Cl. 524—293 **9 Claims**

1. A polycarbonate composition of matter comprised of (1) a polycarbonate resin susceptible to degradation by ultraviolet light and (2) an effective amount of a latent UV stabilizer of the formula



applied to the polycarbonate resin surface by means of a carrier resin which can be cured in situ, the latent UV stabilizer having the properties of permitting UV light to cure the carrier resin without interference by the latent UV stabilizer and at a later time, the carrier resin has been cured to the insoluble state, the latent stabilizer by chemical rearrangement becomes activated as a UV stabilizer for the polycarbonate resin.

4,503,181

CURABLE COMPOSITION

Yasushi Kato; Hisao Furukawa, both of Kobe, and Saori Nakatsuka, Ashiya, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

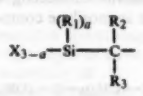
Continuation of Ser. No. 331,781, Dec. 17, 1981, abandoned, which is a continuation of Ser. No. 127,216, Mar. 4, 1980, abandoned. This application Sep. 12, 1983, Ser. No. 531,447

Claims priority, application Japan, Mar. 5, 1979, 54-25728

Int. Cl.^{3} C08K *5/05*

U.S. Cl. 524—391 **2 Claims**

1. A method of storing a polymer having a silyl group for long periods of time without any substantial amount of increase in the viscosity of said polymer, consisting of mixing 100 parts by weight of said polymer, said polymer having at least one silyl group per molecule having the formula:



wherein R, R$_2$, R$_3$ is a hydrogen atom or a monovalent hydrocarbon group selected form alkyl, aryl, or aralkyl group having 1 to 10 carbon atoms, X is a group selected from alkoxy, acryloxy, aminooxy, phenoxy, thioalkyoxy, or amino group, and a is an integer 0, 1 or 2, with about 10 to 50 parts by weight of a stabilizer consisting of one or more aliphatic or aromatic monohydric alcohol having 1 to 10 carbon atoms; and wherein said polymer is a member selected from the group consisting of polyester, polether, ether-ester block copolymer, vinyl polymer, diallyl phthalate monomer or polymer, and a mixture thereof; and wherein said polymer has a molecular weight of between 1,200 and 9,000.

4,503,182

COPOLYMERS USEFUL AS ADDITIVES FOR LOWERING THE CLOUD POINT OF MIDDLE HYDROCARBON DISTILLATES, AND COMPOSITIONS OF MIDDLE HYDROCARBON DISTILLATES COMPRISING THEM

Jean-Pierre Durand, Chatou; Francois Dawans, Bougival; Bernard Damin, Oullins, and Robert Léger, Grigny, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison and Elf France, Paris, both of, France

Filed Jun. 7, 1983, Ser. No. 502,023

Claims priority application France, Jun. 7, 1982, 8209997

Int. Cl.^{3} C08K *5/01*; C08F *8/32*

U.S. Cl. 524—474 **16 Claims**

1. A composition useful as an additive to decrease the cloud point of middle distillates, consisting essentially of an imidized copolymer having a number average molecular weight of 1,000–50,000, and being (1) the condensation product of a copolymer, comprising: 10–90% by mole of recurrent units (A) derived from at least one alkyl ester of an unsaturated monocarboxylic acid and/or at least one vinyl ester of a saturated monocarboxylic acid; 5–40% by mole of recurrent units (B) derived from diisobutylene; and 5–50% by mole of recurrent units (C) derived from at least one α,β-unsaturated dicarboxylic compound in the form of a diacid, a lower alkyl diester or an anhydride, with at least one compound having a primary amine group and having the formula:

$$R\text{-}\left[\text{-}Z\text{—}(CH_2)_n NH\right]_m H \qquad (I),$$

wherein R is a monovalent saturated aliphatic radical having 12–24 carbon atoms; Z is NH or O; n is an integer from 2 to 4; and m is zero or an integer from 1 to 4 when Z is NH, or an integer from 1 to 4 when Z is O; or (2) a copolymer, comprising: 10–90% by mole of recurrent units (A) derived from at least one alkyl ester of an unsaturated monocarboxylic acid and/or at least one vinyl ester of a saturated monocarboxylic acid; 5–40% by mole of recurrent units (B) derived from diisobutylene; and 5–50% by mole of recurrent units (C) derived from the condensation product of at least one α,β-unsaturated dicarboxylic compound in the form of a diacid, a lower alkyl diester or an anhydride, with at least one compound having a primary amine group and having the formula (I) as defined herein.

4,503,183

POLYCARBONATE RESIN MOLDING COMPOSITION

Ping Y. Liu, Naperville, Ill., assignor to Martin B. Barancik, Mt. Vernon, Ind.

Continuation-in-part of Ser. No. 343,941, Jan. 29, 1982, abandoned. This application Nov. 7, 1983, Ser. No. 549,281

Int. Cl.^{3} C08L *33/08, 51/06, 55/02, 69/00*

U.S. Cl. 524—504 **17 Claims**

1. A composition which comprises

(a) a major quantity of a high molecular weight polycarbonate resin;

(b) a multiphase composite interpolymer which comprises a C$_{1-5}$ acrylate and a C$_{1-5}$ methacrylate;

(c) a copolymer of a C$_{2-5}$ olefin and a C$_{1-5}$ acrylate; and

(d) a copolymer of acrylonitrile, butadiene and an alkenyl aromatic compound;

the quantities of (b), (c) and (d) such that a high melt flow index is obtained and wherein as measured by the weight

of (a), (b), (c) and (d) together, (a) is from about 55 to 95 weight percent, (b) is from 0.5 to 15 weight percent, (c) is from about 0.5 to 10 weight percent and (d) is from about 2 to 35 weight percent.

4,503,184

AQUEOUS DISPERSIONS OF SYNTHETIC RESINS, THEIR USE AS BINDERS IN ADHESIVE COMPOSITIONS, AND ADHESIVE COMPOSITIONS OBTAINED

Jacques Marongiu, Ivry, France, assignor to Rhone-Poulenc Specialities Chimiques, Courbevoie, France

Filed Jul. 7, 1983, Ser. No. 511,466
Claims priority, application France, Jul. 9, 1982, 82 12067
Int. Cl.³ C08L *27/00*
U.S. Cl. 524—519 **13 Claims**

1. An aqueous dispersion of synthetic resins comprising a mixture of 20 to 80% by weight of a latex of a copolymer A of butadiene, styrene and at least one ethylenically unsaturated carboxylic acid, and 80 to 20% by weight of a latex of a copolymer B consisting essentially of styrene and an alkyl acrylate having a C_1–C_8 alkyl radical.

4,503,185

VINYL ACETATE/ETHYLENE COPOLYMER EMULSIONS FOR PAPER COATING COMPOSITIONS

Mary L. Hausman, Barto; Gerald D. Miller, Macungie, and Lawrence K. Wempe, Center Valley, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 22, 1984, Ser. No. 623,676
Int. Cl.³ C08L *55/04*
U.S. Cl. 524—553 **24 Claims**

1. A copolymer emulsion comprising a vinyl ester/ethylene copolymer colloidally dispersed in an aqueous medium, the copolymer consisting essentially of (a) a vinyl ester of a C_1–C_{12} alkanoic acid, (b) about 0.5 to 15 wt% ethylene, (c) 0.1 to 10 wt% of an ethylenically unsaturated C_3–C_{10} mono- or dicarboxylic acid or half ester of such dicarboxylic acid with a C_1–C_{18} alkanol, (d) 0.05 to 10 wt% of a dicyclopentadienyl acrylate, and (e) 0–50 wt% of an alkyl acrylate.

4,503,186

CURABLE RESIN COMPOSITION

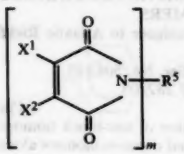
Akitoshi Sugio, Saitama; Masanobu Masu, Tokyo; Masatugu Matunaga, Ibaraki, and Hidenori Kimpara, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Mar. 1, 1982, Ser. No. 353,208
Claims priority, application Japan, Mar. 5, 1981, 56-31859
Int. Cl.³ C08L *51/08*
U.S. Cl. 525—63 **10 Claims**

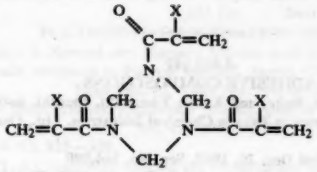
1. A curable resin composition of components comprising:
(a) a polyphenylene ether resin;
(b) at least one compound selected from the group consisting of:
(1) a polyfunctional cyanate ester monomer which is represented by the formula

$$R^6\text{—O—C}\equiv\text{N})_l$$

wherein l is an integer of 2 to 10, and R^6 represents an aromatic organic group having a valence of l, provided that the groups —O—C≡N)$_l$ are directly bonded to the aromatic ring of the organic group,
(2) a prepolymer of (1),
(3) a coprepolymer of (1) and an amine,
(4) a coprepolymer of (1) and a polyfunctional maleimide which is represented by the formula

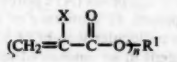


wherein R^5 represents divalent to decavalent aromatic or alicyclic organic group, each of X^1 and X^2 represent a hydrogen atom, halogen atom or alkyl group, and m represents an integer of 2 to 10,
(5) a mixture of at least of (1), (2), (3) and (4) and at least one of said maleimide, a prepolymer of said maleimide, and a coprepolymer of said maleimide and an amine, and
(c) at least one compound selected from the group consisting of compounds having one or more acryloyl, methacryloyl, acryloxy or methacryloxy groups represented by the formulas



(1)

wherein X is as defined above; and



(2)

wherein X is as defined above, R^1 is a residue of a polyhydroxy organic compound having 2–70 carbon atoms and n is an integer of 2 to 10,
said composition including at least one of
(i) a mixture of the components (a), (b) and (c),
(ii) a preliminary reaction product of the components (a), (b) and (c),
(iii) a combination of said mixture (i) and said preliminary reaction product (ii),
(iv) a combination of (a) and a preliminary reaction product of the components (b) and (c), and
(v) a combination of (b) and a preliminary reaction product of the components (a) and (c).

4,503,187

P-METHYLSTYRENE COPOLYMER BLENDS

Binnur Z. Gunesin, Warren, and Alex W. Kawczak, Plainsboro, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 5, 1983, Ser. No. 558,233
Int. Cl.³ C08L *53/02, 23/06, 25/16*
U.S. Cl. 525—71 **19 Claims**

1. A high molecular weight blend comprising in combination from 10 to 50 percent by weight polyethylene, from 50 to 90 percent by weight poly(para-methylstyrene) and from 2 to 10 percent by weight of a hydrogenated diene diblock compatibilizing agent.

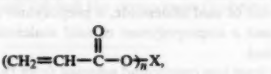
4,503,188

ACRYLATES AS COUPLING AGENTS FOR STAR-BLOCK COPOLYMERS

Paul A. Mancinelli, Aston, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jun. 20, 1983, Ser. No. 506,165
Int. Cl.³ C08F 287/00
U.S. Cl. 525—98 **8 Claims**

1. In a process for the preparation of star-block homopolymers and copolymers of conjugated diene-monomers alone or with monovinyl aromatic monomers by the solution polymerization of the monomers with a monolithium initiator and then coupling the resultant lithiated homopolymer or copolymer with a coupling agent, the improvement comprising using as the coupling agent, in a ratio of coupling agent to lithium of from 2 to 10, a multiester of formula



where X is the radical of a polyhydroxy compound having from 2 to 6 hydroxy groups, and n is an integer equal to the number of hydroxy groups in the polyhydroxy compound, whereby a star-block polymer having from 3 to 20 arms per molecule is formed.

4,503,189

ADHESIVE COMPOSITIONS

Sachio Igarashi, Suita, and Kyuya Yamazaki, Ibaraki, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 20, 1983, Ser. No. 564,080
Claims priority, application Japan, Dec. 21, 1982, 57-225330
Int. Cl.³ C08L 9/02, 27/06, 67/00, 83/00
U.S. Cl. 525—104 **5 Claims**

1. An adhesive composition which comprises (A) a polyester polyol, a polyester polyurethane polyol, or a mixture of said polyols, said polyols each having a molecular weight of 3,000 to 100,000, (B) a silane coupling agent in an amount of about 0.05 to 30 weight %, based on component (A), said silane coupling agent (B) being one represented by the structural formulae R—Si≡$(X)_3$ or R—Si≡$(R')(X_2)$ wherein R is an organic group having a vinyl, epoxy, amino, a substituted amino or a mercapto group; R' is a lower alkyl group; and X is methoxy, ethoxy or chlorine, (C) a vinyl-chloride copolymerization resin in an amount of about 5–40 weight %, based on component (A), said vinyl chloride polymerization resin being composed mainly of vinyl chloride and vinyl acetate and having a molecular weight in the range of about 10,000 to 50,000, (D) a diene synthetic rubber in an amount of about 5–50 weight %, based on component (A), and (E) an organic polyisocyanate wherein the quantity of polyisocyanate (E) is such that the molar equivalent ratio of NCO equivalents from polyisocyanate (E) to the active hydrogen equivalents from the sum of (A), (B), (C) and (D) is in the range of about 1 to 10.

4,503,190

PROCESS FOR THE PREPARATION OF MIXES OF ACRYLIC RUBBERS WITH STYRENE/ACRYLONITRILE COPOLYMERS, ENDOWED WITH IMPROVED IMPACT-RESISTANT CHARACTERISTICS

Leonardo Fiore; Marco Binaghi, and Ugo Bonicelli, all of Milan, Italy, assignors to Montedison S.p.A., Milan, Italy

Filed May 31, 1983, Ser. No. 499,525
Claims priority, application Italy, Jun. 1, 1982, 21619 A/82
Int. Cl.³ C08L 63/02
U.S. Cl. 525—108 **2 Claims**

1. Process for preparing acrylic rubber blends, consisting of (A) copolymers of 95–99.5 mol percent ethylacrylate and/or butylacrylate and 5–0.5 mol percent of acrylic or methacrylic acid, with (B) copolymers of styrene with acrylonitrile, said copolymer (A) being present in amounts of 5–50% by weight of the polymer blend, said process consisting in mixing together said acrylic copolymers (A) with said copolymers (B), at temperatures of from the glass transition temperature of the styrene/acrylonitrile copolymer and 220° C., in the presence of (C) from 0.05% to 2% by weight, on the weight of the polymeric mixture, of a compound selected from the group consisting of zinc chloride, cadmium chloride, ferric chloride, aluminum chloride and boron trifluoride, and (D) of an epoxy resin cross-linking agent having at least two oxirane groups per molecule.

4,503,191

BACKSIZING COMPOSITIONS FOR TEXTILE MATERIALS AND METHOD OF BACKSIZING TEXTILES THEREWITH

Hans-Peter Stakelbeck, Binzen, Fed. Rep. of Germany, assignor to Sandoz Ltd., Basel, Switzerland

Filed Nov. 7, 1983, Ser. No. 549,685
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1982, 3241148
Int. Cl.³ C08K 5/42
U.S. Cl. 524—159 **20 Claims**

1. A composition comprising
(a) a natural or synthetic polymeric latex
(b) a filler, and
(c) a fixing agent for anionic dyestuffs.

4,503,192

CURED ELASTOMERS WITH IMPROVED HIGH TEMPERATURE TEAR STRENGTH

Herbert F. McShane, Jr.; Peter N. Plimmer, both of Wilmington, and Charles W. Stewart, Newark, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 6, 1984, Ser. No. 568,888
Int. Cl.³ C08L 23/26, 23/28
U.S. Cl. 525—192 **4 Claims**

1. A thermoset cured blend of (a) an elastomeric material selected from the class consisting of chlorinated polyethylene, and chlorosulfonated polyethylene and (b) polyethylene, and (c) a conventional curing system for elastomeric chlorinated polyethylene or elastomeric chlorosulfonated polyethylene said blend when cured having a tear strength at 150° C. greater than the tear strength of the unblended cured chlorinated polyethylene or chlorosulfonated polyethylene, said blend containing between 5 and 50 parts by weight of polyethylene per 100 parts by weight of chlorinated polyethylene or chlorosulfonated polyethylene, said polyethylene being a linear polymer of ethylene, having a molecular weight of at least one million, said blend having a room temperature 100 percent modulus of greater than 1000 psi (6.9 MPa).

4,503,193

POLYMER DISPERSIONS AND THEIR USES

Duane A. Heyman, Monroe, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 460,312, Jan. 24, 1983, Pat. No. 4,458,050.
This application Apr. 16, 1984, Ser. No. 600,885
Int. Cl.³ C08L 27/06
U.S. Cl. 525—205 **9 Claims**

1. A mixture comprising
(a) a polymer dispersion prepared by the in situ polymerization of about 10 percent to about 70 percent by weight based upon the total weight of the dispersion of an ethylenically unsaturated monomer or mixture of monomers in a chain extender of a molecular weight of 62 to less than 400 selected from the group consisting of aliphatic and/or araliphatic diols having 2 to 14 carbon atoms in the presence of a free radical polymerization initiator and a polyamide stabilizer having a pendent amide group said polyamide having an average molecular weight of from about 5000 to about 1,000,000, wherein the weight ratio of the

monomer to the polyamide is form about 2:1 to about 100:1; and

(b) a compound containing two or more active hydrogen atoms as determined by the Zerewitinoff method with a molecular weight of 1000 to 8000.

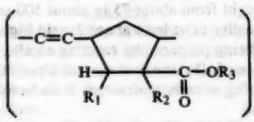
4,503,194

PROCESS FOR PREPARING HEAT-RESISTANT RESINS

Hiroshi Takahashi, Yokkaichi, and Teruhisa Goto, Suzuka, both of Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Sep. 1, 1983, Ser. No. 528,539
Claims priority, application Japan, Sep. 1, 1982, 57-152110
Int. Cl.³ C08F 8/12
U.S. Cl. 525—329.5 **8 Claims**

1. A process for preparing a heat-resistant resin which comprises: dissolving in an organic solvent miscible with water a polymer produced through ring opening of a 5-norbornene-2-carboxylate or a derivative thereof, said polymer comprising a recurring unit represented by the formula



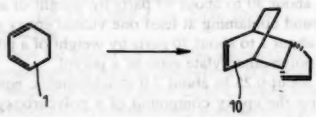
wherein R_1 is hydrogen, an alkyl group or a phenyl group, R_2 is hydrogen or an alkyl group, and R_3 is an alkyl group; adding an alkali to the resulting solution; subjecting the resulting mixture to a first-step hydrolysis treatment until at least a portion of the polymer is separated out; dissolving the polymer which has separated out by adding water to the reaction mixture; optionally adding an alkali to the solution; subjecting the resulting solution to a second-step hydrolysis treatment in the presence of an alkali which is selected from an alkali present in the first-step hydrolysis and an alkali added during the second step hydrolysis; and then neutralizing the resulting hydrolyzate with an acid.

4,503,195

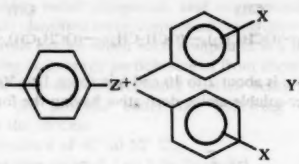
DI- AND TRIPHENYLATED CATION RADICAL POLYMERS AND THEIR USE AS DIELS-ALDER CATALYSTS

Nathan L. Bauld, and Dennis J. Bellville, both of Austin, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Nov. 2, 1981, Ser. No. 317,019
Int. Cl.³ C08F 8/00
U.S. Cl. 525—333.4 **16 Claims**



1. A catalyst composition comprising an insoluble, solid polymer support having covalently attached thereon a plurality of triphenylated cation radical units of the formula:



wherein $Z^{+\cdot}$ represents a monovalent cation radical selected from the group consisting of nitrogen, phosphorus, arsenic, antimony, and bismuth;

each X independently represents hydrogen or a substituted functional group selected from the group consisting of lower alkyl, halogen, hydroxy, alkylhalide, carbonyl, cyano, nitrile, and nitro groups; and

Y^- represents a monovalent anion;

said triphenylated cation radical unit covalently attached through one or more of its phenyl groups to the polymer support.

4,503,196

POLYMER HYDROGENATION PROCESS

Garry L. Rempel, and Hormoz Azizian, both of Waterloo, Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Oct. 12, 1983, Ser. No. 541,252
Claims priority, application Canada, Dec. 8, 1982, 417260
Int. Cl.³ C08F 8/04
U.S. Cl. 525—338 **6 Claims**

1. An improved process for the selective hydrogenation of the carbon-carbon double bonds in a copolymer of a conjugated diene and one or more copolymerizable monomers which comprises hydrogenating said copolymer at a temperature of from about 35° to about 100° C. and at a pressure of hydrogen of from about 0.05 to about 7 MPa the improvement being that said hydrogenation is carried out in the presence of from about 2.5 to about 40 percent by weight of a catalyst which is a monovalent rhodium hydride complex of the general formula $RhHL_x$ in which x is 3 or 4 and L is a ligand compound wherein when x is 4, L is a phosphorus compound selected from 5-phenyl-5H-dibenzophosphole and compounds of the formula $PR_1R_2R_3$ and when x is 3, L is an arsenic or antimony compound of the formula $MR_1R_2R_3$ wherein M is arsenic or antimony and wherein R_1, R_2 and R_3 may be the same or different and are selected from CH_3, C_2H_5, $C_{6\text{-}10}$ aryl groups and $C_{7\text{-}12}$ aralkyl groups, the hydrogenation being carried out in an organic solvent in which said copolymer and said catalyst are soluble and in the absence of any additional amounts of said ligand compound, the concentration of said copolymer in the solution being from about 0.05 to about 20 percent by weight based on the total weight of said solution.

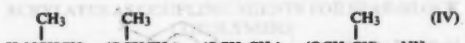
4,503,197

WATER SOLUBLE POLYETHYLENE TEREPHTHALATE DERIVATIVES

George P. Speranza, Austin, and Robert A. Grigsby, Jr., Georgetown, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 23, 1984, Ser. No. 592,650
Int. Cl.³ C08G 63/76, 63/44, 69/44
U.S. Cl. 525—437 **6 Claims**

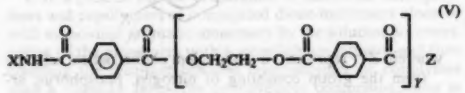
1. A method for the preparation of a water-soluble amine derivative of a polyethylene terephthalate which comprises adding particulate polyethylene terephthalate to an amine in an inert atmosphere with agitation at a temperature of about 150° C. to 250° C. and maintaining said temperature for at least about 2 hours, said amine having the formula:



(IV)

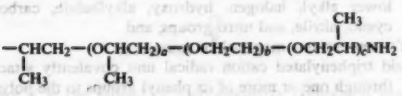
wherein a+c is about 2 to 10 and b is about 1 to 50,

said water-soluble amine derivative having the formula:



(V)

where X represents:

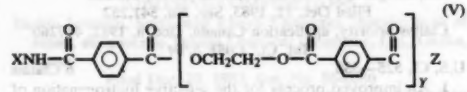


z represents NHX or —OCH_2CH_2OH,

y is a number between 0 and about 4,

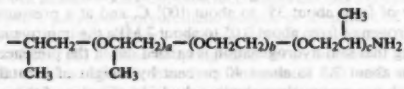
b is a number having a value of about 1 to about 50.

6. A water soluble derivative of polyethylene terephthalate having the formula:



(V)

where X represents:



z represents NHX or —OCH_2CH_2OH,

y is a number between 0 and about 4,

a+c equal about 2 to 10, and

b is a number having a value of about 1 to about 50.

4,503,198

ELECTRON RADIATION CURABLE RESIN

Seiichi Miyai, Tagajyo; Kaoru Nakajima, Izumi, and Masashi Somezawa, Sendai, all of Japan, assignors to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP82/00324, § 371 Date Apr. 18, 1983, § 102(e) Date Apr. 18, 1983, PCT Pub. No. WO83/00696, PCT Pub. Date Mar. 3, 1983

PCT Filed Aug. 19, 1982, Ser. No. 492,023

Claims priority, application Japan, Aug. 19, 1981, 56-129741; Aug. 19, 1981, 56-129742

Int. Cl.³ C08F *2/54, 283/04;* C08G *18/38, 63/68*

U.S. Cl. 525—440 **5 Claims**

1. An electron radiation curable resin comprising an oligopolyester-urethane resin having urethane bonds at both terminals of its polyester moiety, or a polyester-polyurethane resin wherein its polyester moieties are chain-extended through urethane bonds, said resin having a molecular weight of about 1,000 to 50,000, having an acrylate or methacrylate group at each terminal of the molecule, and containing in the molecule about 0.2 to 30 mol% of carboxylic acid component having a metal sulfonate group based on the total carboxylic acid component, said metal sulfonate group being pendent from the polymer chain and constituting a portion of an aromatic or aliphatic dicarboxylic acid.

4,503,199

MODIFIED POLYURETHANE LIQUID POLYMER COMPOSITIONS

James M. O'Connor, Clinton; Donald L. Lickei, Cheshire, and Michael L. Rosin, Madison, all of Conn., assignors to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 410,738, Aug. 23, 1982, abandoned, which is a division of Ser. No. 306,845, Sep. 29, 1981, Pat. No. 4,424,333, which is a continuation-in-part of Ser. No. 203,212, Nov. 3, 1980, abandoned, and a continuation-in-part of Ser. No. 203,218, Nov. 3, 1980, abandoned. This application Feb. 1, 1984, Ser. No. 576,064

The portion of the term of this patent subsequent to Jan. 3, 2001, has been disclaimed.

Int. Cl.³ C08F *283/04*

U.S. Cl. 525—455 **16 Claims**

1. A process for preparing a polyurethane polymer product comprising mixing a polyurethane oligomer and a heat activated free radical generating catalyst, and then heating said mixture at a temperature adequate to activate said catalyst and cure said mixture, said polyurethane oligomer having an equivalent ratio of NCO to OH from about 0.8/1 to about 2/1 and being prepared by reacting

(a) an organic polyisocyanate;

(b) a polyol reactant comprising

(i) a high functionality polyol having an average equivalent weight from about 75 to about 500 and an average functionality of at least about 3, said high functionality polyol being prepared by reacting an alkylene oxide, or a mixture of alkylene oxides, with a polyhydric initiator comprising a carbohydrate or a carbohydrate derivative, and

(ii) a chain extender having an average equivalent weight from about 31 to about 4,000 and an average functionality of about 2, said chain extender being employed in an amount ranging from about 20 to about 1,500 parts by weight per 100 parts by weight of said high functionality polyol; and

(c) an isocyanate reactive group-containing unsaturated monomer selected from the group consisting of

(i) hydroxyalkyl acrylates,

(ii) hydroxyalkyl methacrylates,

(iii) hydroxyalkyl acrylamides, and

(iv) mixtures thereof; and wherein there is employed an equivalent ratio of said isocyanate reactive group-containing unsaturated monomer to said polyol reactant in the range from about 0.6/1 to about 3/1.

4,503,200

HEAT CURABLE POLYEPOXIDE RESIN BLENDS

Larry S. Corley, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 399,576, Jul. 19, 1982, abandoned. This application Mar. 27, 1984, Ser. No. 594,402

Int. Cl.³ C08G *59/16;* C08F *283/10*

U.S. Cl. 525—532 **11 Claims**

1. A heat-curable, styrene-free, composition exhibiting high heat deflection temperatures and excellent physical properties comprising:

(1) from about 30 to about 99 parts by weight of an epoxy compound containing at least one vicinal epoxy group,

(2) from about 1 to about 70 parts by weight of a polyacrylate or polymethacrylate ester of a polyol,

(3) from about 0.25 to about 2.0 stoichiometric equivalents based on the epoxy compound of a polycarboxylic acid anhydride,

(4) an accelerating amount of an onium compound or a stannous salt of a monocarboxylic acid, and

(5) a curing amount of an organic peroxide.

4,503,201

POLYMERIZATION WITH CO REDUCED CHROMYL HALIDE ON SILICA CATALYST

Max P. McDaniel, Bartlesville, and Phil M. Stricklen, Ochelata, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 405,486, Aug. 5, 1982, Pat. No. 4,439,543. This application Jan. 23, 1984, Ser. No. 573,161

Int. Cl.³ C08F 4/24, 4/06, 110/02

U.S. Cl. 526—106 20 Claims

1. A polymerization process comprising contacting at least one mono-1-olefin under polymerization conditions with catalyst produced by a process comprising:

(1) treating a silica material having surface hydroxy groups in an oxygen containing ambient at a temperature sufficient to remove some but not all of said hydroxy groups so as to reduce the OH^- population to about 0.9 to 1.4/nm^2;

(2) contacting the thus-treated silica with a chromyl halide at an elevated temperature to give a silica composition having both chromium and halogen as a part thereof; and

(3) thereafter contacting said chromium and halogen containing silica composition with an ambient comprising carbon monoxide at an elevated temperature to give a final silica composition containing both chromium and halogen.

4,503,202

METHOD FOR PRODUCING POLYBUTADIENE HAVING AN ENHANCED MECHANICAL STRENGTH

Haruo Ueno, Chiba; Hidetomo Ashitaka, Ichihara, and Koichi Nakajima, Chiba, all of Japan, assignors to UBE Industries, Ltd., Chiba, Japan

Filed Sep. 22, 1983, Ser. No. 534,556

Claims priority, application Japan, Oct. 5, 1982, 57-174017

Int. Cl.³ C08F 4/70

U.S. Cl. 526—140 20 Claims

1. A method for producing polybutadiene having enhanced mechanical strength, comprising the steps of:

polymerizing 1,3-butadiene is a polymerization solvent in the presence of a catalyst consisting essentially of (A) a cobalt catalytic component consisting of at least one cobalt compound soluble in said polymerization solvent; (B) an organic aluminum halide catalytic component consisting of at least one organic aluminum halide; (C) a catalyst component consisting of at least one reaction product of a trialkyl aluminum with water; and (D) a catalytic component consisting of at least one member selected from the group consisting of carbon disulfide and phenyl isothiocyanate, to produce polybutadiene consisting of from 5% to 30% by weight of a boiling n-hexane-insoluble fraction and from 70% to 95% by weight of a boiling n-hexane-soluble fraction thereof; and

isolating the resultant polybutadiene from the polymerization mixture.

4,503,203

PREPARATION OF GRANULAR STEREOREGULAR BUTENE-1 POLYMERS IN A FLUIDIZED BED

Nancy M. Golembeski, Fords, N.J.; Robert J. Jorgensen, Dunbar; Robert D. Cleland, Charleston, both of W. Va., and Allen Noshay, East Brunswick, N.J., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Dec. 20, 1983, Ser. No. 563,470

Int. Cl.³ C08F 4/44, 2/00, 10/04

U.S. Cl. 526—159 5 Claims

1. A process for preparing granular stereoregular butene-1 polymers containing at least 80 mol percent of butene-1, and up to 20 mol percent of one or more C_2 to C_6 alpha monoolefins other than butene-1, by continuously polymerizing a monomer charge of butene-1, or butene-1 and one or more C_2 to C_6 alpha monoolefins other than butene-1, in a gas phase fluidized bed process, in the absence of liquid diluent components, by contacting said monomer with a stereospecific olefin polymerization catalyst comprising (A) an organometallic compound and (B) a transition metal compound, said organometallic compound or said transition metal compound being impregnated in an inert porous carrier when such compound is a liquid, said carrier having an average particle size of from about 0.0028 to 0.06 inches, and said impregnated carrier being employed throughout the process, under the following conditions throughout the process:

a temperature of 40° to 55° C.,

a space time yield of 1 to 8 lbs/hour/ft^3,

a total pressure of 80 to 100 psi,

a partial pressure of said monomer charge of 30 to 50 psi,

an inert gas pressure of 50 to 70 psi, and

a hydrogen concentration of 0.1 to 5 mol percent.

4,503,204

SOLUTION POLYMERIZATION

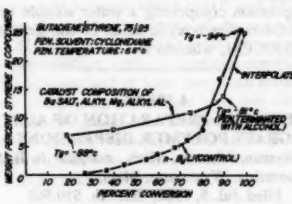
Robert E. Bingham, Cuyahoga Falls; Richard R. Durst, Stow; Hubert J. Fabris, Akron; Ivan G. Hargis, Tallmadge; Russell A. Livigni, and Sundar L. Aggarwal, both of Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 319,820, Nov. 9, 1981, abandoned, and a continuation-in-part of Ser. No. 124,373, Feb. 25, 1980, Pat. No. 4,302,568. This application Feb. 15, 1983, Ser. No. 466,399

The portion of the term of this patent subsequent to Nov. 24, 1998, has been disclaimed.

Int. Cl.³ C08G 12/00

U.S. Cl. 526—187 32 Claims



1. The method which comprises polymerizing under inert conditions in a hydrocarbon solvent at a temperature of from about 0° to 150° C. a polymerizable monomer selected from the group consisting of (A) butadiene-1,3 and (B) at least 50% by weight of butadiene-1,3 and the balance essentially styrene with a catalyst in a minor effective amount sufficient to polymerize said monomer to obtain high trans homopolymers, random copolymers or block copolymers, said catalyst comprising (1) an alcoholate selected from the group consisting of barium alcoholate, calcium alcoholate and strontium alcoholate and mixtures thereof, (2) an organoaluminum compound selected from the group consisting of alkyl and cycloalkyl aluminum compounds and mixtures of the same in which the organic moieties have from 1 to 20 carbon atoms and (3) an organomagnesium compound selected from the group consisting of alkyl and cycloalkyl magnesium compounds and mixtures of the same in which the organic moieties have from 1 to 20 carbon atoms, where the mol ratio computed as metal of barium, calcium and/or strontium to magnesium is from about 1:10 to 1:2 and where the mol ratio computed as metal of magnesium to aluminum is from about 105:1 to 1.5:1 and at about 85% conversion of said monomer to said polymer adding from about 0.01 to 10.0 parts by weight of a chain extender or branching compound selected from the group consisting of divinyl aromatic and trivinyl aromatic compounds per 100 parts by weight of said monomer initially charged to obtain a chain extended, branched or star polymer.

4,503,205

METHOD OF MAKING SOLUBLE POLYACETYLENIC AND POLYAROMATIC POLYMERS

Mahmoud Aldissi, and Raimond Liepins, both of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 16, 1983, Ser. No. 562,243
Int. Cl.[3] C08F 4/06, 4/00, 4/14, 38/00, 138/00, 238/00, 210/00; C08G 65/38
U.S. Cl. 526—221 7 Claims

1. A method of producing a soluble polymer, comprising the steps of:

forming a solution of arsenic trifluoride and a monomer selected from the group consisting of acetylenic and non-substituted aromatic monomers and mixtures thereof; and

introducing into said solution an amount of arsenic pentafluoride sufficient to induce polymerization of said monomer in said solution.

4,503,206

α,ω-PERFLUORODICARBOXYLIC ACIDS

Ivan M. Robinson, Wilmington, Del., assignor to Indiana University Foundation, Bloomington, Ind.

Filed Dec. 22, 1982, Ser. No. 452,393
Int. Cl.[3] C07C 55/02
U.S. Cl. 526—255 9 Claims

1. A method for producing oligomeric α,ω-perfluorodicarboxylic acids of even- and odd-numbered chain lengths, of the general formula $HOOC(CF_2)_nCOOH$, wherein n=1 to about 1000, comprising the step of:

reacting tetrafluorethylene with an inorganic source of hydroxyl radicals in an aqueous environment.

7. A composition comprising a water soluble homologous series of perfluorodicarboxylic acids of the general formula $HOOC(CF_2)_nCOOH$, wherein n=1–9.

4,503,207

PROCESS FOR THE PREPARATION OF ACRYLAMIDE GRAFT POLYMER DISPERSIONS

Duane A. Heyman, Monroe, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jul. 5, 1983, Ser. No. 510,565
Int. Cl.[3] C08L 33/26
U.S. Cl. 526—307.5 6 Claims

1. A white, stable low viscosity graft polymer dispersion prepared by polymerizing, in the presence of an effective amount of a free radical initiator, in an unsaturation containing polyol or polyol mixture, an aqueous solution of acrylamide and removing the water during or after said polymerization.

4,503,208

ACRYLIC FUNCTIONAL SILICONE COPOLYMERS

Samuel Q. S. Lin, South Windsor, and Steven T. Nakos, Andover, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Continuation-in-part of Ser. No. 509,568, Jun. 30, 1983,. This application Jan. 30, 1984, Ser. No. 575,256
Int. Cl.[3] C08G 77/06
U.S. Cl. 528—15 6 Claims

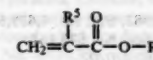
1. A method of preparing an acrylic functional copolymer comprising reacting by hydrosilation reaction a silicon hydride functional silicone copolymer comprising repeat units of the formula

$$R_a^1R_b^2SiO_{(4-a-b)/2} \quad (I)$$

and repeat units of the formula

$$R_a^3R_b^4SiO_{(4-a-b)/2} \quad (II)$$

where R^1, R^2 and R^3 are the same or different alkyl, haloalkyl, aryl, substituted aryl, alkoxy or aryloxy groups; R^4 is H; a is an integer from 0–2, b is an integer from 1–3 and a+b=1, 2 or 3; and the repeat units of formula II represent no more than 30% of the total copolymer repeat units, with an acrylic ester of an acetylenic alcohol having the formula



where R^5 is H or alkyl and $R^{6'}$ is an acetylenic hydrocarbyl group.

4,503,209

ACETAMIDE SCAVENGERS FOR RTV SILICONE RUBBER COMPOSITIONS

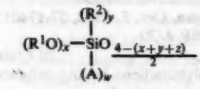
Gary M. Lucas, Scotia, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Feb. 7, 1983, Ser. No. 464,443
Int. Cl.[3] C08G 77/06, 77/04
U.S. Cl. 528—18 32 Claims

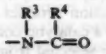
1. A shelf-stable, fast curing one-component RTV silicone rubber composition, comprising,

(A) an organopolysiloxane polymer having a viscosity varying in the range of 100 to 1,000,000 centipoise at 25° C. where the organo group is a monovalent hydrocarbon radical wherein in said polymer, the terminal silicon atoms in the polymer chain have bonded to them at least one alkoxy group;

(B) an effective amount of a scavenging siloxane compound of the formula,



where R^1, R^2 are each individually selected from C_{1-13} monovalent hydrocarbon radicals; and A is a radical selected from the class consisting of radicals of the formula,



and radicals of the formula,

where Y is a radical of the formula,

where R^5, R^6 are individually selected from the class consisting of hydrogen, a C_{1-12} allyl, alkenyl, alkylester, alkylether, aryl, alkaryl and aralkyl radical, v is a whole number that varies from 2 to 8; R^3 is selected from the class consisting of hydrogen and C_{1-8} monovalent hydrocarbon radicals; R^4 is a C_{1-8} monovalent hydrocarbon radical; and x has a value that varies from 0.00 to 2.50; y

has a value that varies from 0.00 to 2.50; w has a value that varies from 0.05 to 1.5; and the sum of x+y+w varies from 2.10 to 3.00.

4,503,210

OXIME CONTAINING COMPOSITIONS WHICH CROSSLINK IN THE PRESENCE OF MOISTURE TO FORM ELASTOMERS AT ROOM TEMPERATURE

Günter Von Au, Jardim dos Estados, Brazil; Karl-Heinrich Wegehaupt, Burghausen, Fed. Rep. of Germany; August Schiller, Neuötting, Fed. Rep. of Germany, and Karl Braunsperger, Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 25, 1984, Ser. No. 573,735

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1983, 3303649

Int. Cl.³ C08G 77/04

U.S. Cl. 528—33 8 Claims

1. A composition which is stable in the absence of moisture, but crosslinks to form an elastomer in the presence of moisture at room temperature which comprises a diorganopolysiloxane having terminal condensable groups, a silicon compound having at least three oxime groups per molecule bonded to silicon via oxygen and a mixture consisting of a silane having four oxime groups bonded to a silicon atom via oxygen and a silane having a hydrocarbon radical bonded to a silicon atom via SiC-bonding and three oxime groups bonded to the silicon atom via oxygen, or an oligomer of the silane mixture, in which the mixture is substituted for at least a part of the silicon compound having at least three oxime groups per molecule bonded to a silicon atom via oxygen.

4,503,211

EPOXY RESIN CURING AGENT, PROCESS AND COMPOSITION

Janis Robins, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Filed May 31, 1984, Ser. No. 616,438

Int. Cl.³ C08G 59/68

U.S. Cl. 528—92 21 Claims

1. A curing agent especially suited for curing thermally curable resin compositions curable therewith, said curing agent comprising

(1) a substituted pentafluoroantimonic acid having the general formula $H^+SbF_5X^-$ wherein X is halogen, a hydroxy, or an OR group wherein OR is the residue of an aliphatic or aromatic alcohol; and

(2) an aromatic amine selected from the group consisting of aniline; and hindered amine

the mole ratio of said substituted pentafluoroantimonic acid to aromatic amine being in the range of 1:1.05 to 1:4.

6. A latent thermally curable composition, curable upon mixing and heating, comprising:

Part A-epoxy resin composition having a 1,2-epoxy equivalency greater than one; and

Part B-a curing agent in an amount sufficient to cure said composition on heating comprising

(1) substituted pentafluoroantimonic acid having the general formula $H^+SbF_5X^-$ wherein X is halogen, a hydroxy, or an OR group wherein OR is the residue of an aliphatic or aromatic alcohol; and

(2) an aromatic amine selected from the group consisting of aniline; and hindered amine

the mole ratio of said substituted pentafluoroantimonic acid to aromatic amine being in the range of 1:05 to 1:4.

4,503,212

SULFONE POLYMER LUBRICANTS OF IMPROVED OXIDATIVE STABILITY

Edward M. Dexheimer, Grosse Ile, Mich., assignor to Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 3, 1982, Ser. No. 446,436

Int. Cl.³ C08G 75/20, 75/23

U.S. Cl. 528—99 8 Claims

1. A process for preparing a polyoxyalkylene compound comprising sequentially reacting a dihydroxydiphenyl sulfone with ethylene oxide and an alkylene oxide selected from the group consisting of propylene oxide and butylene oxide in the presence of a potassium hydroxide catalyst wherein the amount of said alkylene oxide is sufficient to give a final product having a molecular weight of from about 600 to 15,000.

4,503,213

PROCESS FOR THE PREPARATION OF POLYCARBONATES HAVING N-ALKYL-PERFLUOROALKYL SULFONAMIDE TERMINAL GROUPS

Sivaram Krishnan; Dieter Neuray, both of New Martinsville, W. Va.; Wolfgang Cohnen, Leverkusen, and Klaus Geisler, Bonn, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Jun. 21, 1983, Ser. No. 506,189

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1982, 3225884

Int. Cl.³ C08G 63/62

U.S. Cl. 528—199 4 Claims

1. In the two-phase interfacial process for the preparation of an aromatic polycarbonate resin having a weight average molecular weight between about 10,000 and 100,000, as determined from the relative viscosity of the polycarbonate measured in CH_2Cl_2 at 25° C. and at a concentration of about 0.5 gram per 100 milliliter, wherein reactants comprise at least one diphenol, phosgene and at least one chain terminator the improvement comprising reacting at least one chain terminator selected from the group consisting of N-alkyl-perfluoroalkyl sulfonamides and N-cycloalkyl-perfluoroalkyl sulfonamide in an amount of about 1 to 10 mol % relative to the mols of said diphenol, as a chain terminator.

4,503,214

CONTINUOUS PROCESS FOR PREPARING POLYPHENYLENE OXIDES

Dwain M. White, Schenectady, and Susan A. Nye, Feura Bush, both of N.Y., assignors to General Electric Company, Schenectady

Continuation-in-part of Ser. No. 558,404, Dec. 5, 1983, abandoned. This application Apr. 16, 1984, Ser. No. 600,625

Int. Cl.³ C08G 65/44

U.S. Cl. 528—212 16 Claims

1. In the process for forming polyphenylene ether resin wherein a 2,6-di-substituted phenolic compound is contacted with an oxygen-containing gas in a polymerization medium in the presence of a catalyst to produce oxidative coupling, said catalyst comprising copper ions, bromine ions, a diamine of the formula:

$$R^3NH—R^4—NHR^5$$

wherein each of R^3 and R^5 is a secondary or tertiary alkyl group and R^4 is a divalent hydrocarbon group and at least two and no more than three carbon atoms separate the two amino nitrogen atoms and the carbon atoms to which the amino nitrogen atoms are attached are aliphatic, and a tertiary amine from the group consisting of N-methylpyrrolidine, triethylenediamine or a trialkylamine wherein at least two of the alkyl groups are methyl and the third is C_{1-8} primary or C_{3-8} secondary alkyl, the improvement comprising

(a) conducting the oxidative coupling as a continuous process solely in a first and a second continuous stirred tank

reactor interconnected in series flow communication, the ratio of gram moles of copper to moles of phenolic compound is in the range of from about 1:400 to about 1:1200,

(b) passing liquid reaction product formed in said first reactor during a first average reaction time to said second reactor without removing water from said reaction product,

(c) continuing the oxidative coupling in said second reactor during a second average residence time,

(d) vigorously stirring the contents of said first and second reactors during the oxidative coupling, the polymerization medium retaining the polyphenylene ether resin formed in solution throughout the total of said first and second average residence times and

(e) correlating said first and second average residence times such that the intrinsic viscosity of polyphenylene ether resin removed from said second reactor is at least about 0.35 dl/g.

4,503,215

FURFURAL OR FURFURAL ALCHOL IMPREGNANTS FOR CARBONACIOUS BODIES

Edward E. Hucke, Ann Arbor, Mich., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 305,777, Sep. 25, 1981, Pat. No. 4,425,316. This application Jan. 4, 1984, Ser. No. 568,066

Int. Cl.³ C08G *4/00*

U.S. Cl. 528—232 **4 Claims**

1. A liquid impregnant for densifying a permeable carbonaceous body, said impregnant comprising: furfural or furfural alcohol or a mixture thereof, an acid catalyst, and one or more polyols.

4,503,216

HYDROXYL-TERMINATED POLYETHER-ESTERS

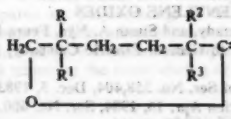
David R. Fagerburg, and Winston J. Jackson, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 21, 1984, Ser. No. 581,937

Int. Cl.³ C08G *63/10*

U.S. Cl. 528—355 **18 Claims**

1. A process for preparing substantially difunctional hydroxyl-terminated polyether-esters which comprises reacting ethylene carbonate with a lactone having the formula



wherein R, R^1, R^2, and R^3 each independently represents H, alkyl, cycloalkyl, alkoxy, or single-ring aromatic radicals, in the presence of a catalytic amount of a catalyst comprising an alkali metal salt, a quaternary ammonium salt, or a mixture thereof, at a temperature of at least about 200° C.

4,503,217

PROCESS FOR SELECTIVE PREPARATION OF POLYMERIC POLYAMINES

David C. Alexander; John F. Knifton, and Susan D. Unvert, all of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Nov. 10, 1983, Ser. No. 550,346

Int. Cl.³ C08G *73/02*

U.S. Cl. 528—392 **25 Claims**

1. A process for selectively preparing polymeric polamine which comprises reacting a mixture comprising a polymeric poly-olefin reactant, a nitrogen-containing compound reactant, carbon monoxide reactant, hydrogen reactant and a catalyst system comprising a ruthenium-containing compound, and a single or two-phase solvent, at a temperature of at least 100° C. and a pressure of at least 100 psi until there is substantial formation of the desired polymeric polyamine and separating the resulting polyamine.

4,503,218

ANTIBIOTIC CEPACIN

Richard B. Sykes, Belle Mead, and William L. Parker, Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 16, 1983, Ser. No. 495,010

Int. Cl.³ C07D *407/14, 407/06*

U.S. Cl. 549—320 **2 Claims**

1. 5-[3-[3-(hepta-1,2-dien-4,6-diynyl)oxiran-2-yl[-3-hydroxy-1-propenyl]dihydro-2(3H)-furanone.

2. 5-[[3-[3-(hepta-1,2-dien-4,6-diynyl)-2-oxiranyl]-2-oxiranyl]hydroxymethyl]dihydro-2(3H)-furanone.

4,503,219

TREATMENT OF (CO)POLYMERS TO REMOVE RESIDUAL MONOMERS

Rudi W. Reffert, Beindersheim; Juergen Hambrecht, Heidelberg; Rudolf H. Jung, Worms, and Adolf Echte, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

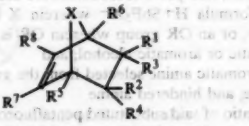
Filed Apr. 28, 1983, Ser. No. 489,558

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1982, 3215911

Int. Cl.³ C08F *6/00*; C08G *6/00*; C08J *3/00*

U.S. Cl. 528—481 **6 Claims**

1. A method of removing residual vinyl-aromatic and/or ethylenically unsaturated monomer(s) from a (co)polymer which is composed of one or more monomers from the group comprising (a) styrene, p-methylstyrene and alpha-methylstyrene and (b) acrylates, methacrylates, acrylonitrile and maleic anhydride which method comprises: adding to the (co)polymer and residual monomer(s) one or more bicyclic compounds of the formula I



I

where X is methylene, ethylene, 1,1-ethenyl, 1,2-ethenyl, carbonyl, azo, amino, ether or thioether group which is unsubstituted or substituted by alkyl, alkenyl, cycloalkyl, aryl, carboxyl, carboxyalkyl, an ether group or a thioether group, R^1, R^2, R^3 and R^4 are each hydrogen, alkyl, alkenyl, cycloalkyl, aryl, carboxyalkyl, or nitrile, R^5 and R^6 are each hydrogen, alkyl or carboxyalkyl, and R^7 and R^8 are each hydrogen, alkyl, alkenyl, aryl, carboxyalkyl, carboxyl or nitrile; thoroughly mixing said compound or compounds of the formula I and said (co)polymer and residual monomer or monomers at a temperature above the glass temperature of the (co)polymer whereby the compound or compounds of the formula I are decomposed and the mixture is devolatilized to remove residual monomer or monomers.

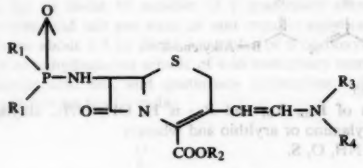
4,503,220

CEPHALOSPORIN DERIVATIVES

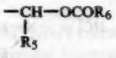
Daniel Farge; Pierre L. Roy, both of Thiais; Claude Moutonnier, Le Plessis Robinson, and Jean-Francois Peyronel, Palaiseau, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

Filed Aug. 16, 1982, Ser. No. 408,674
Claims priority, application France, Aug. 17, 1981, 81 15806
Int. Cl.³ C07D *501/14*; A61K *31/545*
U.S. Cl. 544—16 13 Claims

1. A 3-vinylcephalosporin of the formula:



in which: the two symbols R_1 represent phenyl radicals or radicals $-OZ_1$, in which Z_1 is alkyl, 2,2,2-trichloroethyl, phenyl or benzyl, the said phenyl and benzyl radicals being unsubstituted or substituted by a halogen atom or by an alkyl, alkoxy or nitro radical, or the two radicals Z_1 of the substituents R_1 together form an alkylene radical of 2 or 3 carbon atoms; R_2 represents a radical of the formula:



(in which R_5 represents a hydrogen atom or an alkyl radical and R_6 represents an alkyl or cyclohexyl radical), or a protecting radical; and R_3 and R_4, which are the same or different, represent alkyl radicals (unsubstituted or substituted by an alkoxy or dialkylamino radical) or phenyl radicals, or together form, with the nitrogen atom to which they are attached, a heterocyclic ring chosen from pyrrolidino, piperidino and morpholino, it being understood that the aforesaid alkyl portions or radicals are linear or branched and contain 1 to 4 carbon atoms each, and that the substituent in the 3-position of the bicyclooctene exhibits E stereoisomerism.

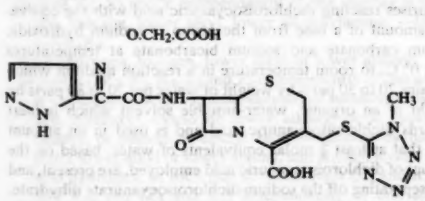
4,503,221

PROCESS FOR CEPHALOSPORANIC ACID DERIVATIVES AND INTERMEDIATE THEREFOR

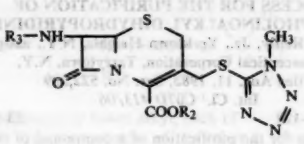
Hans Fliri, and Helmut Hamberger, both of Vienna, Austria, assignors to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 340,435, Jan. 18, 1982, Pat. No. 4,440,767.
This application Jun. 20, 1983, Ser. No. 505,807
Claims priority, application Switzerland, Jan. 19, 1981, 317/81
Int. Cl.³ C07D *417/12*, *501/04*
U.S. Cl. 544—27 2 Claims

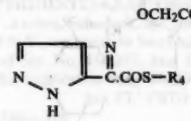
1. The process for preparing a compound


(I)

and salts thereof with bases as well as solvates thereof, comprising reacting a compound of the formula II:

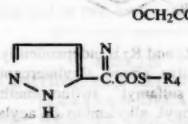

(II)

wherein R_3 represents hydrogen or an amino protecting group and R_2 represents hydrogen, an easily removable ester group or other carboxyl protecting group, with a compound of formula IIIa,


(IIIa)

wherein R_1 represents hydrogen, an easily removable ester group or other carboxyl protecting group, and R_4 is a 2-benzothiazol group, and salts thereof with bases, and if required removing any ester group or protecting group to produce a compound of formula I in free acid form, and recovering the compound of formula I in free acid form or in the form of a salt thereof with a base or in the form of a solvate.

2. A compound of the formula:



wherein R_1 is a hydrogen atom, an easily removable ester group or other carboxyl protecting group, and R_4 is a 2-benzothiazol group; or a salt thereof with a base.

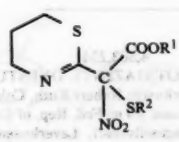
4,503,222

PESTICIDAL NITROMETHANE DERIVATIVES

Martin Harris, Sittingbourne, England, assignor to Shell Oil Company, Houston, Tex.

Filed Jan. 17, 1984, Ser. No. 571,405
Claims priority, application United Kingdom, Jan. 20, 1983, 8301504
Int. Cl.³ C07D *417/00*
U.S. Cl. 544—54 3 Claims

1. Sulphenyl nitromethane derivatives of formula:


I

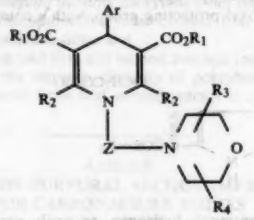
in which R^1 represents an alkyl group or a cycloalkyl-alkyl group of up to 6 carbon atoms and R^2 represents an alkyl group of 1 to 12 carbon atoms optionally substituted by one or more halogen atoms or a phenyl group optionally substituted by one or more halogen atoms or by one or more alkyl or alkoxy groups of 1 to 6 carbon atoms.

4,503,223
PROCESS FOR THE PURIFICATION OF N-MORPHOLINOALKYL DIHYDROPYRIDINES

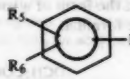
Laurence W. Reilly, Jr., Yorktown Heights, N.Y., assignor to USV Pharmaceutical Corporation, Tarrytown, N.Y.

Filed Aug. 11, 1983, Ser. No. 522,299
Int. Cl.³ C07D *413/06*
U.S. Cl. 544—122 23 Claims

1. A process for the purification of a compound of the formula



wherein Ar is heteroaryl, cycloalkyl having from 3 to 7 carbon atoms, naphthyl, indanyl, indenyl, tetrahydronaphthyl, or a radical of the formula



wherein each of R_5, R_6 and R_7 is independently H, alkyl, aryl, halo, lower alkoxy, nitro, amino, alkylmercapto, cyano, carboxy, carbalkoxy, sulfamyl, trifluoromethyl, hydroxy, acyloxy, methanesulfonyl, alkylamino or acylamino, and R_5 and R_6 when taken together, form a methylenedioxy; Z is alkylene containing 1 to about 5 carbon atoms in the principal chain; each R_1 is independently hydrogen, alkyl or alkoxyalkyl, with the proviso that only one R_1 may be hydrogen; R_2 is lower alkyl and R_3 and R_4 are independently hydrogen or alkyl; wherein the alkyl, alkoxy, and acyl groups contain up to 10 carbon atoms;

comprising the steps of:

dissolving said compound in an organic solvent;

precipitating an acid addition salt of said compound by adding a solution of an acid in an organic solvent thereto;

collecting said precipitate;

dissolving said precipitate in a two-phase solvent, one of said two-phase solvent being an alkaline aqueous phase and the other a water immiscible organic phase;

separating the water immiscible organic phase from the aqueous phase; and

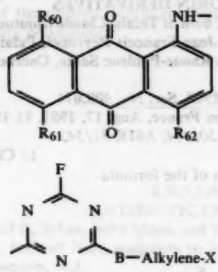
crystallizing the purified compound from said water immiscible organic phase by the addition of an organic solvent.

4,503,224
HALOGENOTRIAZINYL DYESTUFFS

Wolfgang Harms, Leverkusen; Robert Kuth, Cologne, and Klaus Wunderlich, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 16, 1980, Ser. No. 159,747
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1979, 2927520
Int. Cl.³ C07D *251/50*, *251/42*
U.S. Cl. 544—187 1 Claim

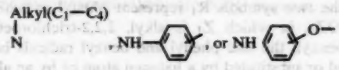
1. A dyestuff of the formula



wherein

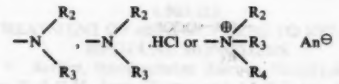
each of R_{60}, R_{61} and R_{62} is H, OH, NH_2, alkylamino, arylamino or arylthio and wherein

B is NH, O, S,



Alkylene is $(CH_2)_{1-3}$

X is



in which

R_2, R_3 and R_4 are H or C_1–C_4-alkyl

$An^{\ominus}$ is an anion.

4,503,225
PROCESS FOR THE PREPARATION OF FREE-FLOWING, COARSELY CRYSTALLINE SODIUM DICHLOROISOCYANURATE DIHYDRATE

Friedrich Lunzer, Ottensheim, Austria, assignor to Chemie Linz Aktiengesellschaft, Linz, Austria

Filed Jul. 12, 1983, Ser. No. 513,160
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1982, 3227817
Int. Cl.³ C07D *251/36*
U.S. Cl. 544—190 8 Claims

1. A process for the preparation of coarsely crystalline, free-flowing sodium dichloroisocyanurate dihydrate, which comprises reacting dichloroisocyanuric acid with the equivalent amount of a base from the group of sodium hydroxide, sodium carbonate and sodium bicarbonate at temperatures from 0° C. to room temperature in a reaction medium which contains 20 to 30 parts by weight of water per 70 to 80 parts by weight of an organic, water-miscible solvent which is inert towards dichloroisocyanuric acid and is used in an amount such that at least 2 molar equivalents of water, based on the amount of dichloroisocyanuric acid employed, are present, and then separating off the sodium dichloroisocyanurate dihydrate, which is obtained in a coarsely crystalline form, and removing the organic solvent, together with free water still adhering, by drying in vacuo at room temperature to 50° C.

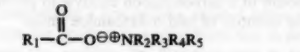
4,503,226

PROCESS FOR TRIMERIZING ORGANIC POLYISOCYANATES

Kuo-Chang Tang, New Haven, and Phillip T. Berkowitz, Woodbridge, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed Apr. 30, 1984, Ser. No. 605,050
Int. Cl.³ C07D *251/34*
U.S. Cl. 544—193 **14 Claims**

1. In a process for trimerizing an organic polyisocyanate in the presence of an isocyanurate group formation catalyst, the improvement which comprises employing as said catalyst from about 0.1 to about 10 mmoles of a quaternary ammonium carboxylic acid salt per mole of said organic polyisocyanate and from about 0.2 to about 3 mmoles of a carboxylic acid halide or anhydride per mmole of said quaternary ammonium carboxylic acid salt, said quaternary ammonium carboxylic acid salt having the formula:



wherein R_1 is selected from the group consisting of hydrogen, C_1–C_{18} alkyl, C_6–C_{24} aryl, C_5–C_{24} cycloalkyl, C_7–C_{24} aralkyl and C_7–C_{24} alkaryl; and R_2, R_3, R_4 and R_5 may each be the same as or different from R_1 and are independently selected from the group consisting of C_1–C_{18} alkyl, C_6–C_{24} aryl, C_5–C_{24} cycloalkyl, C_7–C_{24} aralkyl and C_7–C_{24} alkaryl.

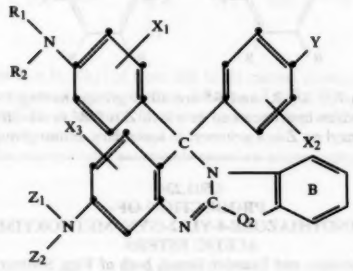
4,503,227

CHROMOGENIC DIHYDROQUINAZOLINES

Heinz Balli, Riehen; Sigmund Gunzenhauser, Arlesheim; Ian J. Fletcher, Magden, and Davor Bedekovic, Therwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 18, 1983, Ser. No. 485,916
Claims priority, application Switzerland, Apr. 22, 1982, 2447/82
Int. Cl.³ C07D *403/14, 403/10, 403/04, 239/74*
U.S. Cl. 544—246 **6 Claims**

1. A chromgenic dihydroquinazoline of the formula



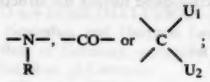
wherein

each of X_1, X_2 and Y independently of one another is hydrogen, halogen, lower alkyl, lower alkanoylamino, $—OR_3$ or $—NR_3R_4$;

X_3 is hydrogen, halogen, lower alkyl or lower alkoxy;

each of R_1, R_2, R_3, R_4, Z_1 and Z_2 independently of one another is C_1–C_{12}alkyl which is unsubstituted or substituted by halogen, hydroxyl, cyano or lower alkoxy, or is cycloalkyl, phenyl, or phenyl or benzyl each substituted by halogen, nitro, lower alkyl or lower alkoxy, and R_1, R_2, R_3 and R_4 are also hydrogen; or each pair of substituents (R_1 and R_2), (R_3 and R_4) and (Z_1 and Z_2) independently of one another, together with the nitrogen atom to which said pair is attached, is a 5- or 6-membered heterocyclic radical;

Q_2 is oxygen, sulfur,



T is hydrogen or lower alkyl; each of

U_1 and U_2 independently of the other is lower alkyl, cyclohexyl, benzyl, or taken together they are alkylene, and the ring B is unsubstituted or substituted by halogen, lower alkyl, lower alkoxy or lower carbalkoxy.

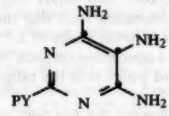
4,503,228

2-(PYRIDINYL)-4,5,6-PYRIMIDINETRIAMINES

George Y. Lesher, Schodack, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 458,297, Jan. 17, 1983, Pat. No. 4,473,571.
This application May 21, 1984, Ser. No. 612,523
Int. Cl.³ C07D *401/04*
U.S. Cl. 544—328 **2 Claims**

1. 2-PY-4,5,6-pyrimidinetriamine having the formula



or acid-addition salt thereof, where PY is 4-pyridinyl or 4-pyridinyl having one or two lower-alkyl substituents.

4,503,229

1,4,5,8-TETRANITRO-1,4,5,8-TETRAAZADIFURAZANO-[3,4-c][3,4-H]DECALIN

Rodney L. Willer, Ridgecrest, Calif., assignor to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 24, 1983, Ser. No. 507,444
Int. Cl.³ C07D *498/22*
U.S. Cl. 544—343 **2 Claims**

1. 1,4,5,8-tetranitro-1,4,5,8-tetraazadifurazano[3,4-c][3,4-h]-decalin.

2. 1,4,5,8-tetraazadifurazano[3,4-c][3,4-h]decalin.

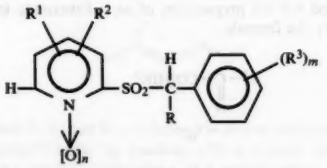
4,503,230

ALKYLATION OF SUBSTITUTED SULFONYLPYRIDINES

John A. Minatelli, Watertown, and Shih-Yu Ma, Cheshire, both of Conn., assignors to Uniroyal, Inc., Middlebury, Conn.

Filed Aug. 20, 1981, Ser. No. 294,665
Int. Cl.³ C07D *213/62*
U.S. Cl. 546—294 **12 Claims**

1. A process for making a substituted sulfonylpyridines of the formula



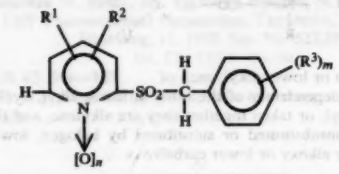
(I)

wherein R is C_1-C_{12} alkyl, allyl or benzyl;

R and R^2 are hydrogen, halogen, C_1-C_4 alkyl or phenyl;

R^3 is hydrogen, halogen, C_1-C_4 alkyl, C_1-C_4 alkoxy, phenoxy, CF_3, NO_2 or phenyl; and

n is 0 or 1, and m is an integer from 1 to 3; comprising contacting a compound having the structural formula



(II)

wherein R^1, R^2, R^3, n and m have the meanings expressed above, with an alkylating agent having the structural formula

$$XR \qquad \text{(III)}$$

wherein X is chlorine or bromine and R has the meanings above;

in the presence of

(a) a quaternary ammonium or phosphonium salt,

(b) solid KOH and NaOH at a molar KOH/NaOH ratio of from 25/75 to 100/0, said KOH and NaOH together present in a concentration such that their molar ratio to said compound II is in the range of 2:1 to 5:1,

(c) water present in a concentration such that the molar ratio of compound II to water is in the range of from 92/8 to 80/20, and

(d) a solvent inert toward the reactant; and subjecting the mixture to alkylating reaction conditions.

4,503,231

HYDROLYSIS OF NITRILES TO AMIDES WITH QUATERNARY AMMONIUM HYDROXIDE

George D. Suciu, Ridgewood, and Joon T. Kwon, Freehold Township, Monmouth County, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Jul. 25, 1983, Ser. No. 516,591

Int. Cl.³ C07D *213/82, 213/85;* C07B *7/00;* C07C *102/08*

U.S. Cl. 546—317 **16 Claims**

1. In a process for hydrolyzing a nitrile to an amide, the improvement comprising:

effecting said hydrolysis of a nitrile to an amide with water at a temperature of from 60° C. to 95° C. in the presence of a catalytically effective amount of a catalyst consisting essentially of a quaternary ammonium hydroxide.

4,503,232

METHOD FOR THE PREPARATION OF α-KETOAMIDE IMINES

Toshiaki Kobayashi, and Masato Tanaka, both of Yatabe, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

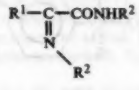
Filed Sep. 24, 1982, Ser. No. 423,182

Claims priority, application Japan, Apr. 24, 1982, 57-69175

Int. Cl.³ C07D *213/36*

U.S. Cl. 546—336 **14 Claims**

1. A method for the preparation of an α-ketoamide imine represented by the formula:



wherein R^1 is a group selected from the group consisting of alkyl, aryl, aralkyl, cycloalkyl, alkenyl and heterocyclic groups optionally substituted with one or more groups selected from the group consisting of alkoxy, alkoxycarbonyl and halogen groups and R^2 is a group selected from the group consisting of alkyl, aryl, aralkyl and cycloalkyl groups, which comprises:

reacting a halogen-containing organic compound represented by the formula R^1X selected from the group consisting of bromobenzene, iodobenzene, bromonaphthalene, 4-iodoanisole, 4-acetylbromobenzene, β-bromostyrene, ethyl β-bromoacrylate, 2-bromo-2-butene, 2-methyl-1-bromo-propene, 2-methylthio-1-bromoethylene, benzyl chloride, ethyl chloroacetate, chloromethylimidazole, chloroacetamide, 3-chloromethylindole, and a halogen-containing heterocyclic compound derived from furan, thiophene, pyrrole or pyridine; a primary aminé represented by the formula R^2NH_2, in which R^2 is selected from the group consisting of methyl, ethyl, propyl, butyl, cyclohexyl, benzyl and phenyl 4-tolyl; and carbon monoxide wherein the carbon monoxide reacts with the halogen-containing organic compound and the primary amine under a partial pressure of from 1 atmosphere to 200 atmospheres in the presence of an effective catalytic amount of a carbonylation catalyst to produce a recoverable quantity of said α-ketoamide imine.

4,503,233

PHOSPHORYLATING AGENT AND PROCESS FOR THE PHOSPHORYLATION OF ORGANIC HYDROXYL COMPOUNDS

Jacobus H. Van Boom, Voorschoten; Gijsbert A. Van Den Marel, Warmond, and Constant A. A. Van Boeckel, Oss, all of Netherlands, assignors to Internationale Octrooi Maatschappij "Octropa" BV, Rotterdam, Netherlands

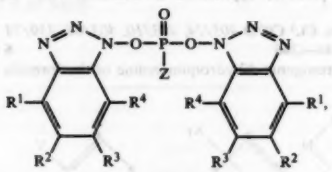
Filed May 10, 1982, Ser. No. 376,510

Claims priority, application Netherlands, May 12, 1981, 8102323

Int. Cl.³ C07F *9/65*

U.S. Cl. 548—114 **2 Claims**

1. Phosphoric acid derivatives having the formula



in which R^1, R^2, R^3 and R^4 are alkyl groups having 1–4 C-atoms and/or hydrogen and in which Z is OR^5 in which R^5 is alkyl or aryl or Z is a primary or secondary amino group.

4,503,234

PRODUCTION OF 2-(2-AMINOTHIAZOLE-4-YL)-2-(SYN)-METHOXYIMINO ACETIC ESTERS

Alfred Huwiler, and Leander Tenud, both of Visp, Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Jul. 24, 1981, Ser. No. 286,636

Claims priority, application Switzerland, Jul. 24, 1980, 5658/80

Int. Cl.³ C07D *277/40*

U.S. Cl. 548—194 **5 Claims**

1. Process for the production of 2-(2-aminothiazole-4-yl)-2-(syn)-methoxyimino acetic ester consisting essentially of (a) oximizing 4-chloroacetoacetic ester, 4-chloro-2-hydroxyiminoacetoacetic ester resulting, (b) reacting the resultant 4-chloro-2-hydroxyiminoacetoacetic ester, without isolation, directly with thiourea in the presence of water at a temperature which does not exceed +40° C., 2-(2-aminothiazole-4-yl)-2-(syn)-hydroxyimino acetic ester, resulting at a temperature which does not exceed +40° C., and methylating the 2-(2-aminothiazole-4-yl)-2-(syn)-hydroxyimino acetic ester with

dimethyl sulfate using a phase transfer catalyst in the presence of an aprotic organic solvent and an alkali lye at a temperature between 0° C. and +5° C.

4,503,235

PROCESS FOR PRODUCING 4-CARBAMOYL-1H-IMIDAZOLIUM-5-OLATE

Phillip D. Cook, and Dennis J. McNamara, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 11, 1983, Ser. No. 474,410

Int. Cl.³ C07D *233/70*

U.S. Cl. 548—301 **5 Claims**

1. A process for producing 4-carbamoyl-1H-imidazolium-5-olate, which comprises reacting substantially equimolar amounts of aminomalonamide and formamidine compound in a liquid medium comprising a low-boiling alcohol under reflux conditions to form the product in a solid form that is directly recoverable from the medium by filtration and is free of aminomalonamide.

4,503,236

ANTIALLERGIC 4H-FURO[3,2-b]INDOLES

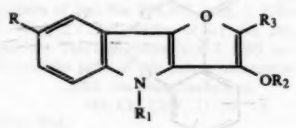
Paul C. Unangst, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 369,448, Apr. 19, 1982, abandoned. This application Jan. 10, 1983, Ser. No. 456,121

Int. Cl.³ C07D *405/02*

U.S. Cl. 548—430 **6 Claims**

1. A compound having the structural formula I



I

wherein R is H, alkyl of from one to six carbon atoms, alkoxy of from one to six carbon atoms, halogen or nitro; R_1 is phenyl or benzyl; R_2 is alkyl of from one to six carbon atoms; R_3 is COOA wherein A is H, alkyl of from one to six carbon atoms, or a pharmaceutically acceptable metal or amine cation.

4,503,237

METHOD FOR THE PRODUCTION OF ACEMETACIN

René Gnehm, Küngoldingen, and Rolf Weber, Zofingen, both of Switzerland, assignors to Siegfried Aktiengesellschaft, Zofingen, Switzerland

Filed Dec. 16, 1982, Ser. No. 450,507

Claims priority, application Switzerland, Dec. 28, 1981, 8306/81

Int. Cl.³ C07D *209/28*

U.S. Cl. 548—501 **1 Claim**

1. A process for producing 1-(p-chlorobenzoyl)-5-methoxy-2-methylindole-3-acetoxyacetic acid comprising acid hydrolysis of 1-(p-chlorobenzyol)-5-methoxy-2-methylindole-3-acetoxyacetic acid tetrahydropyranyl ester with diluted acetic acid at a temperature of about 40° C. to about 60° C. and isolation of the desired product.

4,503,238

PREPARATION OF DIHYDRO-4,4-DIMETHYLFURAN-2,3-DIONE

Joachim Paust, Neuhofen, and Hartmut Leininger, Neustadt, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 16, 1983, Ser. No. 552,389

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1982, 3242560

Int. Cl.³ C07D *307/60*

U.S. Cl. 549—319 **6 Claims**

1. A process for the preparation of dihydro-4,4-dimethylfuran-2,3-dione by oxidation of racemic dihydro-3-hydroxy-4,4-dimethyl-2(3H)-furanone, wherein the oxidation is carried out by gradually adding powdered calcium oxide to a solution of racemic dihydro-3-hydroxy-4,4-dimethyl-2(3H)-furanone and chlorine in an inert organic solvent.

4,503,239

PROCESS FOR THE PREPARATION OF ETHYLENIC HALOGENOACETALS

Jean Desmurs, Lyons, France, assignor to Rhone-Poulenc Sante, Courbevoie, France

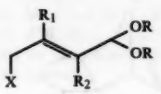
Filed Dec. 16, 1982, Ser. No. 450,447

Claims priority, application France, Dec. 18, 1981, 81 23685

Int. Cl.³ C07D *319/06*

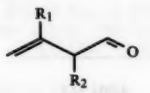
U.S. Cl. 549—369 **7 Claims**

1. A process for the preparation of ethylenic halogenoacetals of the formula:



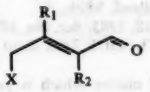
I

in which X represents a halogen atom selected from chlorine and bromine, the symbols R_1 and R_2, which are identical or different, represent a hydrogen atom or a linear or branched alkyl radical containing 1 to 6 carbon atoms, and the symbols R each represent a linear or branched alkyl radical containing 1 to 6 carbon atoms, or together form a linear or branched alkylene radical containing 2 to 6 carbon atoms, which comprises reacting chlorine or bromine with a β,γ-ethylenic aldehyde, of the formula:



V

wherein R_1 and R_2 are defined as above, in the presence of a tertiary amide, to give a halogenoaldehyde of the formula:



VI

in which X, R_1 and R_2 are defined as above, and converting the halogenoaldehyde, by reaction with a primary or secondary aliphatic alcohol containing 1 to 6 carbon atoms, a diol containing 2 to 6 carbon atoms, or an alkyl orthoformate, to the ethylenic halogenoacetal.

2. A process according to claim 1 in which the diol is a glycol.

4,503,240

PROCESS FOR PREPARING 8,12-EPOXY-13,14,15,16-TETRANORLABDANE

Gerhard Staiger, and Antonio Macri, both of Munich, Fed. Rep. of Germany, assignors to Consortium Für Elektrochemische Industrie GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 28, 1983, Ser. No. 517,980

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1982, 3240054

Int. Cl.³ C07D *307/92*

U.S. Cl. 549—458 **8 Claims**

1. A process for preparing 8,12-epoxy-13,14,15,16-tetranorlabdane, comprising the steps of:

(a) converting farnesyl bromide to farnesyl cyanide;

(b) saponifying farnesyl cyanide to homofarnesic acid;

(c) cyclizing homofarnesic acid to norambreinolide in the presence of $SnCl_4$;

(d) converting norambreinolide with lithium aluminum hydride to 8-hydroxy-13,14,15,16-tetranorlabdane-12-ol; and

(e) cyclizing 8-hydroxy-13,14,15,16-tetranolabdane-12-ol in the presence of $POCl_3$.

4,503,241

7-OXABICYCLOHEPTANE PROSTAGLANDIN INTERMEDIATES

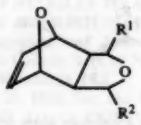
Peter W. Sprague, Pennington, and James E. Heikes, East Windsor, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 13, 1983, Ser. No. 494,232

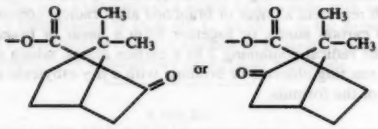
Int. Cl.³ C07D *307/88*

U.S. Cl. 549—459 **7 Claims**

1. An optically active cis endo isomer having the structure



wherein one of R^1 and R^2 is



and the other is H.

4,503,242

STABILIZATION OF AQUEOUS SILICATES USING ALKALI SILICONATES OF SILYLORGANOSULFONATES

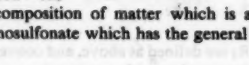
Edwin P. Plueddemann, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 18, 1983, Ser. No. 467,695

Int. Cl.³ C07F *7/08*, *7/10*

U.S. Cl. 556—401 **70 Claims**

1. A composition of matter which is an alkali siliconate silylorganosulfonate which has the general formula

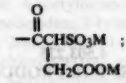


wherein

R is a divalent alkylene radical of 3 or 4 carbon atoms;

R′ is a monovalent radical selected from a group consisting essentially of hydrogen and $-(CH_2)_aSO_3M$;

R″ is a monovalent radical selected from a group consisting essentially of $-(CH_2)_aSO_3M$ and



R‴ is R′ or R″;

M in all formulas is an alkali cation;

n is all formulas has a value of 1, 2 or 3;

x has a value of 0 or 1; and

a has an average value of 0 to 3.

4,503,243

DIOXASILEPIN AND DIOXASILOCIN STABILIZERS

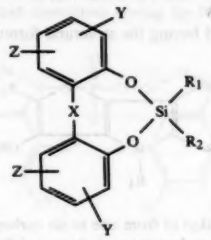
John D. Spivack, and Stephen D. Pastor, both of Spring Valley, N.Y., assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Jan. 12, 1983, Ser. No. 457,349

Int. Cl.³ C07F *7/08*, *7/18*

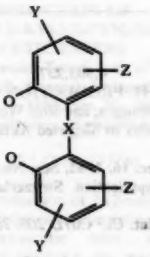
U.S. Cl. 556—427 **16 Claims**

1. A compound of the formula



wherein

R_1 and R_2 independently are hydrogen, alkyl of 1 to 4 carbon atoms or phenyl; or R_1 and R_2 together form



X is a direct bond, alkylidene of 1 to 7 carbon atoms or sulfur;

Y is alkyl of 4 to 12 carbon atoms or alkaryl of 7 to 12 carbon atoms; and

Z is hydrogen, alkyl from 1 to 12 carbon atoms or phenyl.

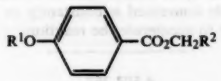
4,503,244

SEBOSUPPRESSIVE TOPICAL COSMETIC PREPARATIONS CONTAINING ALKOXYBENZOIC ACID ESTERS, PROCESS FOR INHIBITING SEBUM PRODUCTION AND ALKOXYBENZOIC ACID ESTERS

Hinrich Möller, and Siegfried Wallat, both of Monheim, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 12, 1983, Ser. No. 560,582
Claims priority, application Fed. Rep. of Germany, Jan. 17, 1983, 3301313
Int. Cl.³ C07C *69/76*
U.S. Cl. 514—544 12 Claims

1. A topical cosmetic preparation for the treatment of seborrhea containing a sebosuppressively effective amount of at least one alkoxybenzoic acid ester having the formula



wherein R^1 represents a C_{6-20}-n-alkyl and R^2 is a member selected from the group consisting of $-CH_2OR^3$, $-C_2H_4OR^3$, $-CH_2OC_2H_4OR^3$, $-CH_2OH$, $-C_2H_4OH$, $-CH(CH_3)OH$, $-CH_2NR^3R^4$, $-C_2H_4NR^3R^4$, $-CO_2R^3$ and $-CH_2CO_2R^3$, wherein R^3 and R^4 are C_{1-4}-alkyl, as an antiseborrheic, and further containing conventional vehicles and additives for topical application.

4,503,245

SOLVENT AND CATALYST RECOVERY AND RECYCLE IN THE MANUFACTURE OF PHENOXYBENZOIC ACID DERIVATIVES

Thomas J. Giacobbe, Skillman; Thomas N. Williams, Jr., Plainfield, both of N.J., and James M. Horn, Richmond, Va., assignors to Rhone-Poulenc, Inc., Monmouth Junction, N.J.

Continuation of Ser. No. 518,975, Aug. 2, 1983, Pat. No. 4,456,767, which is a continuation of Ser. No. 286,942, Jul. 27, 1981, abandoned. This application Nov. 3, 1983, Ser. No. 548,364
The portion of the term of this patent subsequent to Jun. 26, 2001, has been disclaimed.
Int. Cl.³ C07C *51/16*
U.S. Cl. 562—414 19 Claims

1. A process for recovering and recycling solvent in the oxidation of a 3-(substituted phenoxy) toluene feed to the corresponding 3-(substituted phenoxy) benzoic acid employing a combination of a cobalt compound and a bromide compound as catalyst which comprises:

(a) distilling a first solvent from the oxidation reaction mixture containing 3-(substituted phenoxy)benzoic acid and cobalt compound;

(b) combining solvent-depleted reaction mixture from (a) with a second solvent which dissolves the 3-(substituted phenoxy)benzoic acid and is capable of forming an immiscible layer with an aqueous solution of lower aliphatic carboxylic acid;

(c) combining solution of 3-(substituted phenoxy)benzoic acid from (b) with an aqueous solution of lower aliphatic carboxylic acid which dissolves the cobalt compound to extract the cobalt compound from the solution;

(d) separating the solution layer of 3-(substituted phenoxy)-benzoic acid from the aqueous solution layer of lower aliphatic carboxylic acid and dissolved cobalt compound;

(e) separating the aqueous solution of lower aliphatic carboxylic acid from extracted cobalt compound resulting from steps (c) and (d); and

(f) recycling the first solvent recovered from (a) to serve as solvent in the oxidation of an additional quantity of 3-(substituted phenoxy)toluene feed.

4,503,246

PROCESS FOR PREPARATION OF GLYOXYLIC ACID

Tadayuki Mitani, and Mamoru Endo, both of Arai, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Dec. 1, 1981, Ser. No. 326,296
Claims priority, application Japan, Dec. 1, 1980, 55-169256; Aug. 12, 1981, 56-126146
Int. Cl.³ C07C *51/16, 59/153*
U.S. Cl. 562—531 14 Claims

1. A process for preparing glyoxylic acid which comprises reacting an aqueous solution of glyoxal with diatomic chlorine gas at a reaction temperature in the range of 0° C. to 100° C.

4,503,247

PROCESS FOR PRODUCING METHACRYLIC ACID

Sargis Khoobiar, Kinnelon, N.J., assignor to The Halcon SD Group, Inc., New York, N.Y.

Division of Ser. No. 47,860, Jun. 12, 1979, Pat. No. 4,377,501, which is a continuation-in-part of Ser. No. 973,354, Dec. 12, 1978, Pat. No. 4,374,757, which is a continuation-in-part of Ser. No. 972,745, Dec. 26, 1978, Pat. No. 4,252,682, which is a continuation-in-part of Ser. No. 973,495, Dec. 26, 1978, Pat. No. 4,252,683. This application Jul. 6, 1982, Ser. No. 395,406
The portion of the term of this patent subsequent to May 22, 2000, has been disclaimed.
Int. Cl.³ C07C *51/25, 57/055*
U.S. Cl. 562—535 2 Claims

1. A process for the preparation of methacrylic acid which comprises oxidizing methacrolein in the vapor-phase with molecular oxygen in the presence of a catalyst composition having the formula $Mo_aCu_bP_cSb_dCs_eRe_fO_g$, where: a=12; b=0.05–3; c=0.1–5; d=0.01–1; e=0.1–3; f=0.005–0.5; and g=value determined by the valence and proportions of the other elements of the formula.

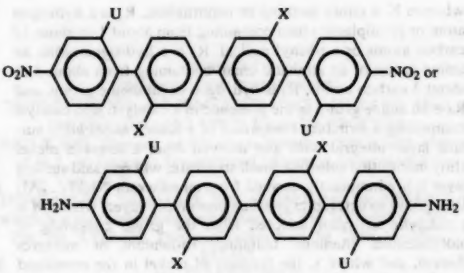
4,503,248

SUBSTITUTED-QUATERPHENYLENE MONOMERS FOR THE PRODUCTION OF POLYAMIDES THEREFROM

Russell A. Gaudiana, Merrimack, N.H., and Palaiyur S. Kalyanaraman, Chalfont, Pa., assignors to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 239,180, Mar. 2, 1981, Pat. No. 4,393,194. This application May 27, 1983, Ser. No. 498,984
Int. Cl.³ C07C *87/00*
U.S. Cl. 564—307 3 Claims

1. A compound having the formula



wherein each of U and X is halo; alkoxy; or trifluoromethyl.

4,503,249

HYDROGENATION CATALYSTS

Gerhard P. Nowack; Marvin M. Johnson, and Donald C. Tabler, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 289,350, Aug. 3, 1981, Pat. No. 4,394,298, which is a continuation of Ser. No. 111,053, Jan. 10, 1980, abandoned. This application Sep. 21, 1982, Ser. No. 420,780

Int. Cl.³ C07C 85/12

U.S. Cl. 564—385 4 Claims

1. A process for hydrogenating organic materials comprising contacting them with hydrogen under suitable conditions in the presence of a catalyst comprising at least one metal salt selected from the group consisting of iron (II) hexacyanocobaltate, and ruthenium (II) hexacyanocobaltate.

4,503,250

PREPARATION OF POLYALKYLENE POLYAMINES

William B. Herdle, Greenburgh, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 307,228, Sep. 30, 1981, abandoned. This application Sep. 16, 1983, Ser. No. 532,767

Int. Cl.³ C07C 85/06

U.S. Cl. 564—479 10 Claims

1. A process for preparing predominantly linear polyalkylene polyamines which comprises reacting ammonia or an alkyleneamine compound having two primary amino groups or mixtures thereof with an alcohol having primary or secondary hydroxyl groups or an alkanolamine compound having a primary or secondary amino group and a primary or secondary hydroxyl group or mixtures thereof in the presence of a derivative of carbonic acid as a catalyst sufficient to effect the reaction resulting in the formation of predominantly linear polyalkylene polyamines at a temperature at which the reaction will proceed under pressures sufficient to maintain the reaction mixture substantially in the liquid phase; and recovering the polyalkylene polyamines from the product mixture.

4,503,251

RANEY NICKEL CATALYSIS OF AROMATIC AMINES

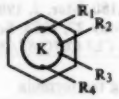
Thomas J. Gray, Guilford; Norman G. Masse, Wallingford, and Richard A. Hagstrom, Cheshire, all of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed Apr. 5, 1982, Ser. No. 365,211

Int. Cl.³ C07C 85/24

U.S. Cl. 564—450 22 Claims

1. In a method for hydrogenating an amine-substituted aromatic compound of the type



wherein K is either benzene or naphthalene, R_1 is a hydrogen atom or an aliphatic chain containing from about 1 to about 12 carbon atoms or a phenyl radical, R_2 is a hydrogen atom, an amine group or an aliphatic chain containing from about 1 to about 3 carbon atoms, R_3 is hydrogen or an amine group, and R_4 is an amine group in the presence of a catalyst, said catalyst comprising a structure comprised of a Raney metal alloy surface layer integral with and derived from a selected nickel alloy monolithic substrate mesh structure, wherein said surface layer is predominantly derived from an adherent $Ni_xM_{1-x}Al_3$ Beta phase structured crystalline precursory layer, where M is a catalytic activator selected from the group consisting of molybdenum, titanium, tantalum, ruthenium or mixtures thereof, and where x, the fraction of nickel in the combined weight of Ni and M, is within the range of from about 0.80 to about 0.95.

4,503,252

PROCESS FOR THE PREPARATION OF SERINOL AND OF SERINOL DERIVATIVES, AND PRODUCTS OBTAINED THEREFROM

Ernst Felder, Riva S. Vitale, Switzerland; Sergio Bianchi, Milan, Italy, and Heinrich Bollinger, Beringen, Switzerland, assignors to Eprova Aktiengesellschaft, Schaffhausen, Switzerland

Continuation of Ser. No. 183,860, Sep. 3, 1980, abandoned. This application Nov. 15, 1982, Ser. No. 441,777

Claims priority, application Switzerland, Sep. 10, 1979, 8182/79

Int. Cl.³ C07C 85/04, 85/24

U.S. Cl. 564—474 2 Claims

1. The method for the synthesis of serinol comprising reacting 1,3-dimethoxy-isopropylchloride intially with excess ammonia by heating to 170° C. to form 1,3-dimethoxy-isopropylamine and subsequently converting this intermediate to serinol by refluxing it with aqueous hydrochloric acid and wherein the hydrogen chloride consumed is constantly or is periodically replaced in order to accelerate the reaction.

4,503,253

PRODUCTION OF NONCYCLIC POLYALKYENE POLYAMINES

Michael E. Ford, Center Valley, and Thomas A. Johnson, Orefield, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

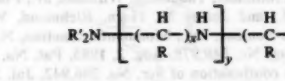
Filed Mar. 8, 1984, Ser. No. 587,435

Int. Cl.³ C07C 85/06

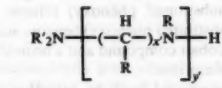
U.S. Cl. 564—479 20 Claims

1. A process for preparing a noncyclic polyalkylene polyamine which comprises:

(a) contacting an alkanolamine compound having a primary amino group and a primary or secondary hydroxyl group of the general formula



where R is hydrogen or a lower alkyl (C_1–C_4) radical, x is a number from 2 to 6, and y is a number from 0 to 3, with ammonia and an alkyleneamine compound having two primary amino groups of the general formula:



where R is hydrogen or a lower alkyl (C_1–C_4) radical, x' is a number from 2 to 6, and y' is a number from 1 to 4, in the presence of a catalytically effective amount of a supported phosphoric acid at a temperature from about 210° C. to about 350° C. under a pressure sufficient to maintain a substantial amount of the ammonia in the reaction zone, and

(b) recovering the noncyclic polyalkylene polyamine from the resultant reaction mixture.

4,503,254

PROCESS FOR MAKING BIS(HALOPHENYL)HEXAFLUOROPROPANES

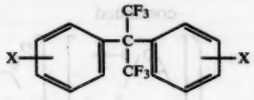
William J. Kelleghan, Whittier, Calif., assignor to Hughes Aircraft Company, El Segundo, Calif.

Filed Mar. 24, 1982, Ser. No. 361,281

Int. Cl.³ C07F 9/53

U.S. Cl. 568—14 4 Claims

1. A process for preparing a reactive monomer whose structure is



where X is a halogen comprising the steps of:

forming a reaction mixture by blending a triphenyl-phosphine dihalide reactant with a 2,2-bis(hydroxphenyl)hexafluoropropane reactant; and

heating said mixture to at least 280° C. to promote a reaction between said reactants as evidenced by the evolution of a gaseous by-product, thereby forming a solid mixture of said monomer and triphenylphosphine oxide which may be subsequently separated to give high yields of said monomer.

4,503,255

PROCESS FOR RECOVERING TRIARYLPHOSPHINE FROM POISONED RHODIUM CATALYST SYSTEMS

David F. Booker, Royston; David E. Grove, Cambridge, both of England; Phillip J. Cotterill, Greenfield, and Robert G. Tyson, Prestatyn, both of Wales, assignors to Johnson Matthey Public Limited Company, London, England

Filed Apr. 29, 1982, Ser. No. 373,176

Claims priority, application United Kingdom, May 1, 1981, 8113503

Int. Cl.³ C07F 9/50

U.S. Cl. 568—17 **9 Claims**

1. A process for recovering triarylphosphine from a poisoned rhodium catalyst system comprising components which include rhodium moiety, triarylphosphine and poison, the process comprising separating components by evaporative and crystallisation techniques wherein the poison comprises a poisonous amount of alkyldiarylphosphine and therein the process also comprises:

(a) subjecting the poisoned catalyst system to conditions of temperature and pressure which cause evaporative separation from the rhodium moiety of a vapour comprising triarylphosphine and material which is more volatile than triarylphosphine and then condensing the vapour,

(b) subjecting the condensed vapour to a further but milder evaporative process which causes evaporation of at least some of the material which is more volatile than triarylphosphine so producing a concentrate of triarylphosphine and then

(c) mixing the concentrate with a polar solvent, cooling the mixture to a temperature at which the triarylphosphine crystallises from the remainder of the mixture and recovering the crystallised triarylphosphine by physical separation from the remainder of the mixture.

4,503,256

PHLOROPHENONE DERIVATIVES, PROCESSES FOR PREPARING SUCH COMPOUNDS, USES AND PHARMACEUTICAL COMPOSITIONS OF PHLOROPHENONE COMPOUNDS

Theunis G. Fourie; Theodor G. Dekker; Friedrich O. Snyckers, and Cornelis J. van der Schyf, all of Pretoria, South Africa, assignors to Noristan Limited, Pretoria, South Africa

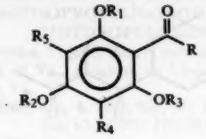
Filed Jun. 21, 1982, Ser. No. 390,415

Claims priority, application South Africa, Jul. 2, 1981, 81/4480

Int. Cl.³ C07C 49/78, 49/825

U.S. Cl. 568—331 **7 Claims**

1. A compound of the general formula I:



wherein

R is a branched or unbranched alkyl, cycloalkyl or benzyl group, which group optionally contains as a substituent one halogen, alkoxy or hydroxy group,

R_1, R_2 and R_3, which may be the same or different are each hydrogen, alkyl, or benzoyl, which group optionally contains as a substituent one halogen, hydroxy or alkoxy group,

R_4 is a benzyl group,

R_5 is hydrogen, an alkyl, benzyl, alkanoyl or phenyl group, which group optionally contains as a substituent one alkyl, phenyl, halogen, hydroxy or alkoxy group

except that R_5 is not hydrogen when R is methyl, i-propyl, branched butyl or methoxy metyl

and physiologically acceptable salts thereof.

4,503,257

CYCLOHEXYL HYDROPEROXIDE DECOMPOSITION PROCESS

Joe D. Druliner, Newark, and Joshua Hermolin, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 18, 1983, Ser. No. 495,736

Int. Cl.³ C07C 45/53

U.S. Cl. 568—342 **8 Claims**

1. In a process for producing a mixture containing cyclohexanol and cyclohexanone, wherein cyclohexyl hydroperoxide is decomposed in the presence of cyclohexane to provide a mixture containing cyclohexanol and cyclohexanone, the improvement comprising contacting a reaction mixture comprising cyclohexane and from about 0.1 to about 10 percent by weight cyclohexyl hydroperoxide with a catalytic amount of a heterogeneous catalyst consisting essentially of MnO_2or FeO_3O_4 applied to a catalyst support selected from the group consisting of SiO_2, porous glass, Al_2O_3, TiO_2, ZrO_4, and carbon, said catalyst support characterized by a surface area to weight ratio of at least 1 m^2/g, at a temperature from about 80° C. to about 130° C., in the presence of from about 0.5 to about 4 moles of molecular oxygen per mole of cyclohexyl hydroperoxide to be decomposed.

4,503,258

PROCESS FOR PREPARING 1(4-PENTENOYL)-3,3-DIMETHYLCYCLOHEXANE AND INTERMEDIATES USED IN SAID PROCESS

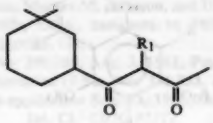
John B. Hall, Rumson, and Mark A. Sprecker, Sea Bright, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 441,221, Nov. 12, 1982, Pat. No. 4,449,007, which is a continuation-in-part of Ser. No. 375,767, May 6, 1982, Pat. No. 4,413,139. This application Nov. 14, 1983, Ser. No. 551,481

Int. Cl.³ C07C 49/21

U.S. Cl. 568—376 **3 Claims**

1. The compound defined according to the structure:



wherein R_1 is selected from the group consisting of hydrogen and 2-propenyl.

4,503,259

METHYL SUBSTITUTED-2-OXOHEXANE DERIVATIVES AND PROCESSES FOR PREPARING AND USING SAME

Richard M. Boden, Monmouth Beach; Lambert Dekker, Wyckoff; Frederick L. Schmitt, Holmdel, all of N.J., and Augustinus G. Van Loveren, Rye, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

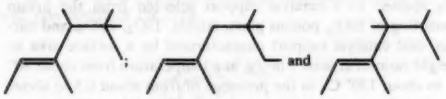
Division of Ser. No. 345,665, Feb. 4, 1982, Pat. No. 4,421,679, Continuation-in-part of Ser. No. 195,630, Oct. 9, 1980, Pat. No. 4,335,009, Continuation-in-part of Ser. No. 160,788, Jun. 19, 1980, Pat. No. 4,287,084. This application May 24, 1983, Ser. No. 497,670

Int. Cl.[3] **C07C** *49/203, 45/28*

U.S. Cl. 568—382 **4 Claims**

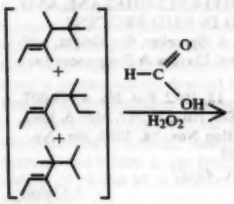
3. The process comprising the steps of:

(i) dimerizing isoamylene to form diisoamylene in the presence of an acid catalyst, said diisoamylene being a mixture of compounds having the structures:



said diisoamylene having a distillation range of 36°–40° C. vapor temperature; 74°–94° C. liquid temperature and 4–5 mm/Hg pressure;

(iii) admixing the resulting diisoamylene mixture with a mixture of concentrated hydrogen peroxide and formic acid in order to effect the reaction:



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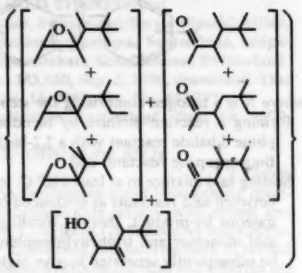
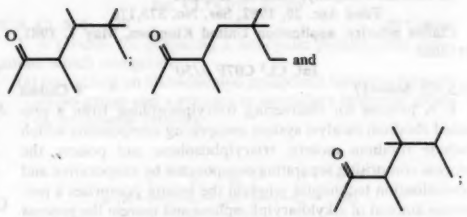
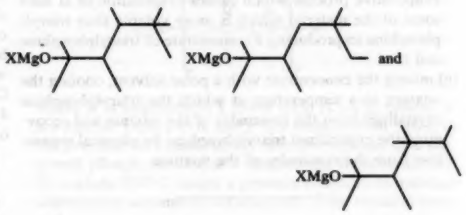


at a temperature in the range of from about 40° C. up to about 70° C.;

(iii) distilling the resulting reaction product at a vapor temperature in the range of from about 93° C. up to about 100° C. vapor temperature; 109° C. up to 120° C. liquid temperature at 50 mm/Hg pressure whereby a mixture of ketones is formed having the structures:



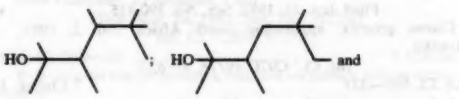
(iv) reacting the resulting mixture of ketones with a methyl magnesium halide in the presence of an inert solvent whereby a mixture of organometallic compounds is formed having the structures:



; and

wherein X is chloro or bromo;

(v) reacting the resulting organometallic compound mixture with acid thereby forming a mixture of alcohols having the structures:



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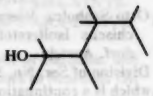


(vi) fractionally distilling the resulting acid mixture at a temperature in the range of 70°–74° C. vapor temperature; 95°–113° C. liquid temperature and 10 mm/Hg pressure.

4,503,260

GLYCOLALDEHYDE PROCESS

Steven R. Auvil, Macungie, Pa., and Patrick L. Mills, Creve Coeur, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jun. 13, 1983, Ser. No. 504,001
Int. Cl.³ C07C *45/49*
U.S. Cl. 568—462 **10 Claims**

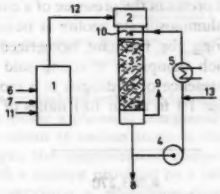
1. A process for the production of glycol aldehyde which comprises reacting (1) a liquid hemi-formal having the formula R'—O—CH_2—OH, wherein R' is an alkyl or cycloalkyl group, (2) carbon monoxide and (3) hydrogen in a solvent system and in the presence of an amount of rhodium catalyst sufficient to catalyze the formation of glycol aldehyde and wherein said catalyst has at least one modifying ligand associated with one rhodium atom and said ligand is a tertiary organo phosphine moiety or a tertiary organo arsenic moiety or combinations thereof, said process being further characterized in that it is carried out under conditions of elevated pressure and elevated temperature conducive to the formation of glycol aldehyde.

4,503,261

PREPARATION OF GLYOXAL

Wolfgang Sauer, Kirchheimbolanden; Klaus Halbritter, Mannheim, and Heinz Engelbach, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 22, 1982, Ser. No. 400,690
Int. Cl.³ C07C *45/38*
U.S. Cl. 568—471 **6 Claims**



1. A process for the continuous preparation of glyoxal by oxidation of ethylene glycol, which comprises: passing ethylene glycol, oxygen and an inert gas continuously at from 450° to 800° C. over a catalyst consisting essentially of copper and silver, said catalyst consisting essentially of one or more layers of copper crystals and one or more layers of silver crystals, the copper and silver crystals having a particle size of from 0.1 to 2.5 mm.

4,503,262

PROCESS FOR THE PRODUCTION OF 2,6-DIISOPROPYLNAPHTHALENE DIHYDROPEROXIDE

B. Franklin Gupton, Virginia Beach, and Edwin D. Little, Portsmouth, both of Va., assignors to Virginia Chemicals, Inc., Portsmouth, Va.

Filed Aug. 4, 1983, Ser. No. 520,470
Int. Cl.³ C07C *179/035*
U.S. Cl. 568—575 **7 Claims**

1. In a process for the conversion of 2,6-diisopropylnaphthalene to 2,6-diisopropylnaphthalene hydroperoxide wherein said 2,6-diisopropylnaphthalene is dissolved in an organic solvent and contacted with an oxygen-containing gas in a basic mediur at elevated temperatures, which are in the range of about 50° C. to about 100° C. at atmospheric pressure, in the presence of a catalyst selected from the group consisting of heavy metal oxides, hydroxides, organic acid salts and mixtures thereof, the improvement which comprises using a C_5–C_{14} aliphatic hydrocarbon as said organic solvent.

4,503,263

PROCESS FOR THE PREPARATION OF OCTANE BOOSTING BRANCHED ALIPHATIC ETHERS USING SOLID SUPERACID CATALYSTS

George A. Olah, Beverly Hills, Calif., assignor to Atochem, Paris la Defense, France

Continuation of Ser. No. 178,890, Aug. 18, 1980, abandoned. This application Sep. 2, 1982, Ser. No. 414,434
Int. Cl.³ C07C *41/05*
U.S. Cl. 568—694 **12 Claims**

1. A process for producing branched chain aliphatic ethers which comprises passing an olefin and water in the gas phase over a solid heterogeneous C_{10} to C_{18} perfluorinated alkanesulfonic acid superacidic catalyst under continuous flow conditions at a reaction temperature sufficient to maintain the olefin and the water in the gas phase but below about 120° C. and contacting the olefin and the water with the catalyst for a sufficient length of time to produce an ether selectivity equal to or more than about 80%.

4,503,264

PROCESS FOR THE MANUFACTURE OF METHYL TERT.-BUTYL ETHER

Ghazi R. Al-Muddarris, Cologne, Fed. Rep. of Germany, assignor to Davy McKee AG, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 216,683, Dec. 15, 1980, abandoned. This application Aug. 16, 1982, Ser. No. 408,207
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1980, 3027965
The portion of the term of this patent subsequent to May 11, 1999, has been disclaimed.
Int. Cl.³ C07C *41/05*
U.S. Cl. 568—697 **13 Claims**

1. A process for the manufacture of methyl tert.-butyl ether which comprises isomerizing n-butane to form isobutane in an isomerization stage, catalytically dehydrogenating resulting isobutane in a dehydrogenating stage to form an isobutane/isobutene mixture, steam reforming natural gas to form a synthesis gas containing CO and H_2 in a steam reforming stage, converting the resulting synthesis gas to methanol in a methanol synthesis stage, etherifying the resulting methanol with isobutene in the isobutene/isobutane mixture to form methyl tert.-butyl ether in an etherification mixture, separating isobutane from the etherification mixture, recycling separated isobutane to the dehydrogenation stage, burning secondary product gases from at least one of the isomerization, dehydrogenation and methanol synthesis stages in a combustion stage to form hot combustion gases, generating and superheating steam at high pressure by heat exchange with the resulting hot combustion gases, expanding at least a part of the resulting high pressure steam to a medium pressure in first back-pressure

turbines coupled to compressors for the compression of the synthesis gas and of the dehydrogenation stage product gas, supplying part of resulting medium pressure steam as process steam to the steam reforming stage, expanding another part of said medium pressure steam in second back-pressure turbines to low pressure steam in excess of atmospheric pressure, and utilizing resulting low pressure steam for heating apparatus employed in said process for the manufacture of methyl tert.-butyl ether.

4,503,265

PROCESS FOR THE PRODUCTION OF METHYL TERT.-BUTYL ETHER (MTBE) AND OF HYDROCARBON RAFFINATES SUBSTANTIALLY FREED FROM I-BUTENE AND FROM METHANOL

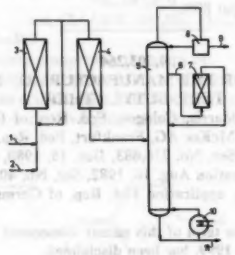
Bernhard Schleppinghoff, Dormagen, and Martin Becker, Cologne, both of Fed. Rep. of Germany, assignors to EC Erdolchemie GmbH, Koeln-Warringen, Fed. Rep. of Germany

Filed Nov. 18, 1982, Ser. No. 442,692

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1981, 3148109

Int. Cl.³ C07C *41/06*

U.S. Cl. 568—697 **9 Claims**



1. A process for the production of methyl tert.-butyl ether and of a hydrocarbon raffinate which is substantially free of isobutene and of methanol from methanol and a hydrocarbon mixture containing isobutene, which consists essentially of contacting methanol and isobutene contained in a hydrocarbon mixture in substantially equimolar amounts in a reaction zone in the presence of an acid cation exchange material, feeding the resultant reaction mixture into a distillation column, distilling off an overhead, withdrawing of bottoms and simultaneously with distilling off said overhead and withdrawing said bottoms, removing a side cut from said distillation column, passing said side cut into a secondary reaction zone containing an acid cation exchange material and reacting components therein to form additional methyl tert.-butyl ether, feeding the reaction product of said secondary reaction zone back into said distillation column at a point below the point at which said side cut is withdrawn, recovering a bottoms product which is substantially pure methyl tert.-butyl ether and obtaining an overhead containing hydrocarbons and unreacted methanol.

4,503,266

CONDENSATION PROCESS

Otto Szabolcs, Vienna, Austria, assignor to Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft, Wiener Neudorf, Austria

Division of Ser. No. 379,433, May 18, 1982, Pat. No. 4,467,122, which is a continuation-in-part of Ser. No. 250,669, Apr. 3, 1981, abandoned, which is a continuation-in-part of Ser. No. 083,609, Oct. 11, 1979, abandoned. This application Jun. 7, 1984, Ser. No. 617,967

Claims priority, application Austria, Dec. 5, 1978, 8666/78

Int. Cl.³ C07C *39/12*

U.S. Cl. 568—719 **2 Claims**

1. 9,9-bis-(4-hydrophenyl)-fluorene with a melting point of at least 228° C.

4,503,267

EXTRACTION OF PHENOLICS FROM HYDROCARBONS

Mark S. Pavlin, Lawrenceville, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed Oct. 24, 1983, Ser. No. 544,772

Int. Cl.³ C07C *37/86, 37/70*

U.S. Cl. 568—753 **5 Claims**

1. A method of separating phenolic compounds from admixture with a non-aromatic hydrocarbon, which comprises; extracting the phenolic compounds from the admixture into a liquid polyethylene glycol having a molecular weight of at least 200.

4,503,268

PREPARATION OF MONOCHLOROHYDROQUINONE

James G. Pacifici, and Allen J. Blankenship, both of Batesville, Ark., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 14, 1983, Ser. No. 551,760

Int. Cl.³ C07C *39/08, 39/24*

U.S. Cl. 568—765 **2 Claims**

1. Process for the preparation of monochlorohydroquinone which comprises treating hydroquinone with chlorine in hydrochloric acid at a temperature of 100° to 105° C.

4,503,269

ISOMERIZATION OF CRESOLS

Dusan J. Engel, Des Plaines; Thomas P. Malloy, Lake Zurich, and James P. Shoffner, Elk Grove Village, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Sep. 21, 1983, Ser. No. 534,225

Int. Cl.³ C07C *37/48, 37/00*

U.S. Cl. 568—783 **7 Claims**

1. In a process for the isomerization of a cresol which comprises treating said cresol in the presence of a catalyst comprising a crystalline aluminosilicate zeolite at isomerizing conditions and recovering the resultant isomerized product, the improvement which comprises effecting said isomerization treatment in the presence of hydrogen in a mole ratio in the range of from about 1:1 to about 10:1 moles of hydrogen per mole of cresol.

4,503,270

METHOD OF PRODUCING 2,3,6 TRIMETHYLPHENOL

John J. Talley, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 21, 1983, Ser. No. 553,659

Int. Cl.³ C07C *37/46, 39/06*

U.S. Cl. 568—783 **29 Claims**

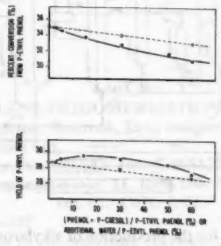
1. A method of producing 2,3,6 trimethylphenol comprising heating 2,4,6 trimethylphenol in the presence of an aluminum halide catalyst at a temperature in the range of about 80° C. to about 150° C. under pressure.

4,503,271

PROCESS FOR THE PRODUCTION OF PARA-VINYL PHENOL BY DEHYDROGENATION OF PARA-ETHYL PHENOL

Hiroshi Fujiwara; Hatsutaro Yamazaki, both of Saitama, and Kazuo Ozawa, Ibaraki, all of Japan, assignors to Maruzen Oil Co., Ltd., Osaka, Japan

Filed Sep. 2, 1983, Ser. No. 528,839
Claims priority, application Japan, Jun. 15, 1983, 58-107262
Int. Cl.³ C07C 37/00, 39/19
U.S. Cl. 568—799 11 Claims



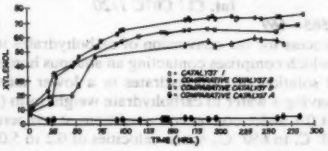
1. A process for the production of p-vinyl phenol by dehydrogenation of p-ethyl phenol in a gaseous phase at a temperature of 400° to 700° C. in the presence of a catalyst capable of dehydrogenation and a diluent, wherein said dehydrogenation of p-ethyl phenol is effected in the presence of phenol and p-cresol in amounts such that the total amount of said two components falls in the range of 5 to 40% by weight based on the amount of p-ethyl phenol, and the ratio of the amount of said phenol to that of said p-cresol falls in the range of 1:0.5 to 1:5 by weight.

4,503,272

PROCESS FOR MAKING ORTHO-ALKYLATED PHENOLS

James G. Bennett, Jr., Glenmont, N.Y.; Freddie L. Tungate, Georgetown, Ind., and John J. Kokoszka, Delmar, N.Y., assignors to General Electric Company, Selkirk, N.Y.

Filed May 20, 1983, Ser. No. 496,696
Int. Cl.³ C07C 37/16, 39/06
U.S. Cl. 568—804 15 Claims



1. In a process for making ortho-alkylated phenols by reacting in the vapor phase a phenolic compound and an alcohol containing up to about 16 carbon atoms in the presence of an alkylation catalyst, the improvement comprising catalyzing said reaction with a catalyst provided by a calcination residue of a mixture comprising a magnesium-containing material selected from the group consisting of magnesium carbonate, basic magnesium carbonate, or magnesium hydroxide; and a manganese hydroxide formed as as precipitate by bringing together an aqueous solution of a manganese salt and an aqueous solution of ammonium hydroxide in the presence of said magnesium-containing material wherein said mixture is characterized by a mole ratio of manganese to magnesium in a range from about 0.02 to 1.0 to about 0.25 to 1.0 and said ortho-alkylation process takes place at a temperature in a range from about 300° C. to about 500° C.

4,503,273

HYDROGENATION OF PHENOLS

Edward C. Mozdzen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 29, 1982, Ser. No. 427,219
Int. Cl.³ C07C 35/21
U.S. Cl. 568—816 13 Claims

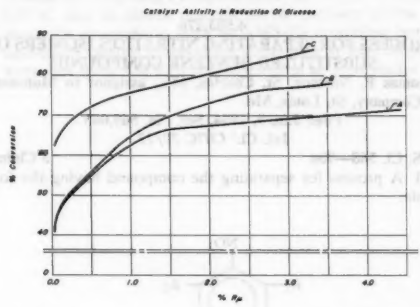
1. A process for hydrogenating one or more phenolic molecules comprising contacting same with hydrogen in the presence of a supported catalyst containing a Group VIII metal-containing substance under conditions of temperature, pressure, and reaction time sufficient to achieve quantitative or nearly quantitative conversion of the reactant phenol to hydrogenated phenol, said supported catalyst having been pretreated with a mixture of an organic solvent having polar functional groups selected from alcohols, esters, polyethers, amides, sulfones and chlorinated hydrocarbons and an alkali or alkaline earth metal alkaline material.

4,503,274

RUTHENIUM HYDROGENATION CATALYST WITH INCREASED ACTIVITY

Blaise J. Arena, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 8, 1983, Ser. No. 521,465
The portion of the term of this patent subsequent to Apr. 19, 2000, has been disclaimed.
Int. Cl.³ C07C 29/132, 29/14, 31/26
U.S. Cl. 568—863 10 Claims



1. In the method of hydrogenating a carbohydrate in aqueous solution to its polyols comprising contacting at hydrogenation conditions a reaction medium consisting essentially of said solution with hydrogen and a catalyst consisting essentially of zerovalent ruthenium dispersed on a hydrothermally stable support, the improvement wherein the zerovalent ruthenium is produced by reduction of a ruthenium impregnate with hydrogen at a temperature from about 100° C. to about 300° C.

4,503,275

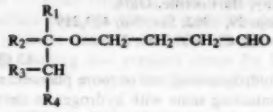
PRODUCTION OF BUTANE-1,4-DIOL

Norman Harris, Stockton-on-Tees; Alan J. Dennis, Middlesbrough, and George E. Harrison, Billericay, all of England, assignors to Davy McKee (London) Limited, London, England

Continuation of Ser. No. 321,087, Nov. 13, 1981, abandoned, which is a continuation of Ser. No. 139,570, Apr. 11, 1980, abandoned. This application Sep. 16, 1983, Ser. No. 532,821
Claims priority, application United Kingdom, Apr. 11, 1979, 7912851
The portion of the term of this patent subsequent to Sep. 1, 1998, has been disclaimed.
Int. Cl.³ C07C 29/00, 31/20
U.S. Cl. 568—866 10 Claims

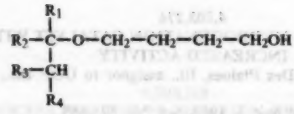
1. A process for the production of butane-1,4 diol which

comprises reducing an aldehyde-ether of the general formula:



(I)

wherein R_1 and R_2 each, independently of the other, represent a C_1 to C_4 alkyl radical, and R_3 and R_4 each, independently of the other, represent a hydrogen atom or a C_1 to C_3 alkyl radical, or wherein R_1 represents a C_1 to C_4 alkyl radical, R_2 and R_3 together with the carbon atoms to which they are attached form a 5-membered or 6-membered cycloaliphatic ring, and R_4 represents a hydrogen atom or a C_1 to C_3 alkyl radical, to form a hydroxy ether of the general formula:



(II)

wherein R_1, R_2, R_3 and R_4 are as defined above, cleaving resulting hydroxy-ether of the general formula (II) at a temperature of 130° C. or less to give butane-1,4-diol, and recovering resulting butane-1,4-diol.

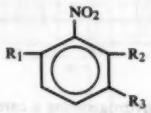
4,503,276

PROCESS FOR SEPARATING NITRATION ISOMERS OF SUBSTITUTED BENZENE COMPOUNDS

Thomas E. Nickson, St. Charles, Mo., assignor to Monsanto Company, St. Louis, Mo.

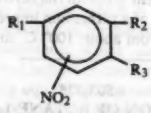
Filed Jan. 9, 1984, Ser. No. 569,065
Int. Cl.³ C07C *79/12*
U.S. Cl. 568—936 **5 Claims**

1. A process for separating the compound having the formula:



I

from a mixture of hindered and unhindered nitration isomers having the formula:



II

comprising the steps of:

(a) mixing a nonorganic sulfide salt with the mixture to reduce substantially all of the unhindered nitration isomers in the mixture with no reduction of substantially all of the hindered nitration isomer; and

(b) separating the reduced isomers from the hindered nitration isomer;

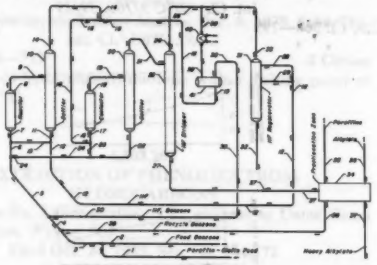
wherein in the above formula R_1 and R_2 are independently lower (C_1–C_4) alkyl, CF_3, alkanoyl, carboxyl, aryl, sulfo, alkyl-sulfone, or halogen, and R_3 is independently hydrogen, lower (C_1–C_4) alkyl, CF_3, alkanoyl, carboxyl, aryl, sulfo, alkyl-sulfone, or halogen.

4,503,277

HF REGENERATION IN AROMATIC HYDROCARBON ALKYLATION PROCESS

James F. Himes, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 30, 1983, Ser. No. 556,755
Int. Cl.³ C07C *2/64*
U.S. Cl. 585—455 **12 Claims**



1. In a process for the production of alkylaromatic hydrocarbons in which a feed aromatic hydrocarbon is contacted wiht an acyclic C_6-plus olefinic hydrocarbon and liquid phase HF in an alkylation zone at alkylation-promoting conditions to effect the production of the product alkylaromatic hydrocarbon, the resultant alkylation zone effluent separted in a separation zone into a hydrocarbon phase and a denser liquid HF phase, and at least a portion of said denser liquid HF phase regenerated by the removal of high boiling hydrocarbonaceous compounds therefrom; the improvement which comprises introducing the major part of said portion of the denser liquid HF phase from said separation zone into an intermediate point in the height of a regeneration column maintained at regeneration conditions, and passing a smaller part of said portion of the denser liquid HF phase directly from said separation zone into a higher point of said column as reflux therein.

4,503,278

PROCESS FOR CONVERTING CARBOHYDRATES TO HYDROCARBONS

Nai Y. Chen, Titusville, and Leonard R. Koenig, Trenton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 430,461, Sep. 30, 1982, abandoned. This application Jan. 30, 1984, Ser. No. 574,638
Int. Cl.³ C07C *1/20*
U.S. Cl. 585—469 **9 Claims**

1. A process for the conversion of carbohydrates to hydrocarbons which comprises contacting an aqueous homogeneous saturated solution of carbohydrates in a lower monohydric alcohol having a water to carbohydrate weight ratio (wt./wt.) of at least 0.3 under conversion conditions at temperatures of about 300° C. to 650° C., space velocities of 0.2 to 5.0 WHSV and pressures of 1 to 50 atmospheres absolute with a crystalline silicate zeolite catalyst having a constraint index of about 1 to 12 and a dried crystal density in the hydrogen form not substantially less than about 1.6 grams per cubic centimeter, and thereafter recovering a hydrocarbon product of increased carbon content.

4,503,279

ETHYLENE OLIGOMERIZATION PROCESS

David M. Singleton, Seabrook, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 501,581, Jun. 6, 1983, Pat. No. 4,472,522. This application Jun. 11, 1984, Ser. No. 619,250
Int. Cl.³ C07C *2/02*
U.S. Cl. 585—523 **8 Claims**

1. A process of oligomerizing ethylene to a mixture of ole-

finic products comprising a large proportion of alpha-olefins having high linearity which process comprises reacting ethylene in liquid phase solution at a temperature of about 25° C. to 150° C. in the presence of a catalyst composition produced by contacting in a polar organic solvent in the presence of ethylene (1) a simple divalent nickel salt having a solubility of at least 0.001 mole per liter in said polar organic solvent (2) a boron hydride reducing agent and (3) an o-dihydrocarbylphosphinophenyl alcohol and/or lower alkyl ether ligand, the molar ratio of nickel salt to ligand being from about 1:1 to 5:1.

4,503,280

ETHYLENE OLIGOMERIZATION PROCESS

David M. Singleton, Seabrook, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 501,582, Jun. 6, 1983, Pat. No. 4,472,525. This application Jun. 11, 1984, Ser. No. 619,249

Int. Cl.[3] **C07C** *2/02*

U.S. Cl. 585—527 **6 Claims**

1. A process of oligomerizing ethylene to a mixture of olefinic products comprising a large proportion of alpha-olefins having high linearity by reacting the ethylene in an inert liquid diluent and in an inert reaction environment in the substantial absence of oxygen, at a temperature of about 25° C. to 250° C., in the presence of a catalytic amount in the range from 0.001 to 100% by weight, based on ethylene, of a catalyst which is the product of the reaction of one mole of a nickel compound comprising an atom of nickel in complex with an olefinically unsaturated compound, with an o-dihydrocarbylphosphinophenyl alcohol and/or lower alkyl ether ligand.

4,503,281

PREPARATION OF C_2-C_4-OLEFINS FROM METHANOL/DIMETHYL ETHER

Wolfgang Hoelderich; Wolf D. Mross, both of Frankenthal, and Matthias Schwarzmann, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 7, 1984, Ser. No. 577,762

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1983, 3304479

Int. Cl.[3] **C07C** *1/20*

U.S. Cl. 585—640 **4 Claims**

1. A process for the preparation of C_2-C_4-olefins by catalytic conversion of methanol and/or dimethyl ether in the presence of a zeolite catalyst at elevated temperatures, wherein the catalyst used is a pure borosilicate zeolite which has been tableted or extruded without a binder and treated with hydrofluoric acid and hydrochloric acid.

4,503,282

PROCESS TO CONVERT LINEAR ALKENES SELECTIVELY USING HIGH CONCENTRATIONS OF AMS-1B CRYSTALLINE BOROSILICATE CATALYST

David L. Sikkenga, Wheaton, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sep. 24, 1982, Ser. No. 422,742

Int. Cl.[3] **C07C** *3/20, 5/30*

U.S. Cl. 585—671 **21 Claims**

1. A process to convert a substantially linear alkene to isomerized alkenes with low formation of light and heavy by-products comprising contacting such alkene under conversion conditions comprising a temperature of above 300° C. to about 650° C. and an alkene reactant partial pressure of less than about 0.4 atmospheres with an AMS-1B crystalline borosilicate-based catalyst composition containing at least 50 wt. % hydrogen form AMS-1B incorporated in an inert binder.

4,503,283

CABLE STUB ASSEMBLY AND METHODS OF MAKING

Harvey G. Hancock, Dunwoody, Ga., and Michael E. Szymanski, Elkhorn, Nebr., assignors to AT&T Technologies, Inc., New York, N.Y.

Filed May 27, 1983, Ser. No. 499,064
Int. Cl.³ H02G *15/08, 15/24, 1/14*
U.S. Cl. 174—22 R 16 Claims

1. A cable stub assembly for connecting a cable which is pressurized with a gaseous medium to another cable, said assembly comprising:

a length of cable which includes a core comprising a plurality of conductors and a jacket which encloses spaced portions of the core with one of the portions enclosed by the jacket destined to be connected to the cable that is pressurized with the gaseous medium;

at least one sleeve which is made of an irradiation cross-linked polyolefin material and which has an inner surface that is coated with an adhesive material, said sleeve being disposed in sealed compressive engagement with the one portion of the length of cable that is destined to be connected to the cable that is pressurized with the gaseous medium;

a length of tubing which is made of a plastic material and which encloses portions of the portions that are enclosed in the jacket and conductors of the core between the portions that are enclosed in the jacket; and

a plastic filling material which is disposed within said tubing and which is adhered to an outer surface of said sleeve to prevent the escape of the gaseous medium from the pressurized cable.

10. A method of making a cable stub assembly, said method including the steps of:

removing a jacket from an interior portion of a length of a cable to expose individual conductors of the cable;

moving a heat shrinkable, irradiation cross-linked polyolefin sleeve which has an inner surface coated with an adhesive material over each portion of the cable which is adjacent to the exposed conductors such that a portion of each sleeve engages an end portion of the jacket;

applying sufficient heat energy to each sleeve to melt the adhesive on its inner surface and to cause the sleeves to contract into sealed compressive engagement with the jacket;

positioning a length of plastic tubing over the sleeves so that it extends to each side of the exposed conductors and is disposed generally concentrically about the cable;

closing one end of the tubing; and

introducing a curable plastic material into the tubing, the plastic material adhering to the sleeves to prevent the loss of a gaseous medium which is introduced subsequently into at least one portion of the cable length.

4,503,284

RF SUPPRESSING MAGNET WIRE

Michael G. Minnick, and Robert O. Weisz, both of Fort Wayne, Ind., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed Nov. 9, 1983, Ser. No. 550,279
Int. Cl.³ H01B *11/06*
U.S. Cl. 174—36 1 Claim

1. An insulating magnet wire comprising an electrical conductor coated with at least one layer of electrically insulating polyurethane material, said layer overcoated with a semiconductive layer of polyurethane modified nylon containing about 10 percent to about 40 percent by weight of electrically conductive carbon black particles, said semiconductive layer having a volume resistivity of about 0.1 ohm-centimeter to about

1000 ohm-centimeter and capable of suppressing radio frequency signals from about 100 KHz to about 100 MHz.

4,503,285

FLEXIBLE BASE MATERIALS, THEIR PREPARATION AND THEIR USE FOR PRINTED CIRCUITS

Roland Darms, Therwil; Theobald Haug, Frenkendorf, and Harry Beyeler, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

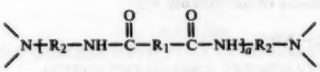
Division of Ser. No. 422,425, Sep. 23, 1982, abandoned, which is a continuation of Ser. No. 298,963, Sep. 3, 1981, abandoned. This application May 21, 1984, Ser. No. 612,996
Claims priority, application Switzerland, Sep. 15, 1980, 6904/80; Jul. 3, 1981, 4397/81
Int. Cl.³ H05K *1/00*
U.S. Cl. 174—68.5 6 Claims

1. A flexible, printed circuit with excellent adhesion of the printed circuit tracks, which is obtained by

coating one side of a metal foil without any interlayer with a polymer consisting of a polyamide/polyimide block copolymer with recurring structural elements of the formula I

$$[(A)—(E)] \quad \text{(I)}$$

in which n is a integer from 1 to 500, A is a polyamide block with a basic structural unit of the formula II or III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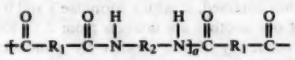
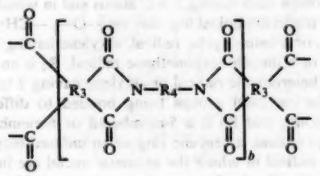
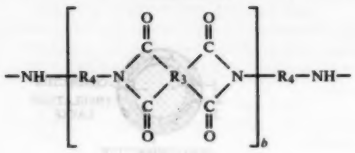

(III)

and E is a polyimide block with a basic structural unit of the formula IV or V


(IV)

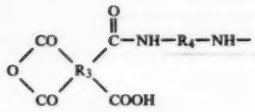
or

-continued

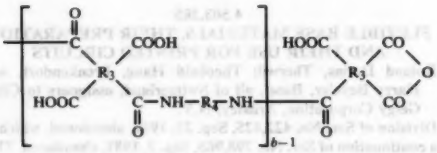


(V)

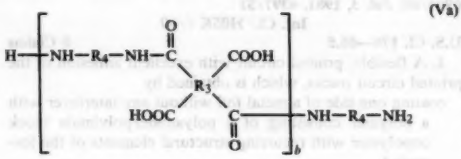
or consists of a polyamide/polyimide copolymer which is obtained by reacting a polyamide acid of the formula IVa or Va



(IVa)

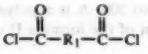


or



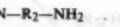
(Va)

with a dicarboxylic acid dichloride of the formula XI



(XI)

and a diamine of the formula XII



(XII)

and subsequently cyclising the polyamide/polyamide acid copolymer thus obtained, in which formulae a and b independently of one another are integers from 2 to 100, R_2 and R_4 independently of one another are a monocyclic aromatic radical which is unsubstituted or substituted by halogen atoms or alkyl or alkoxy groups each having 1–4 C atoms, an unfused bicyclic aromatic radical which is unsubstituted or substituted by halogen atoms or alkyl or alkoxy groups each having 1–4 C atoms and in which the aromatic nuclei are linked together via —O—, —CH_2—or —SO_2—, or a heterocyclic radical, alkylene having 2–12 C atoms or a dicyclohexylmethane radical, R_1 is an aromatic or heterocyclic radical or alkylene having 2 to 8 C atoms, the carbonyl groups being bonded to different carbon atoms, and R_3 is a 5-membered or 6-membered cycloalkyl radical, a benzene ring or an unfused bicyclic aromatic radical in which the aromatic nuclei are linked together via the bridge member —O—, —CO— or —CONH— and the carbonyl groups are bonded to different ring C atoms which are adjacent in pairs,

heating the coated metal foil in the temperature range from 50° to 300° C. till a track-free coating is obtained,

exposing the opposite side of the coated metal foil, which side is provided with a photolacquer, through a photo mask, and

developing the exposed metal foil.

4,503,286

INPUT DEVICE

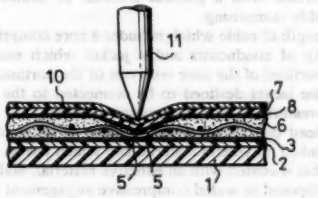
Yoshizo Kubo, and Ikuo Utagawa, both of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jul. 1, 1983, Ser. No. 510,331

Claims priority, application Japan, Jul. 3, 1982, 57-100117[U]

Int. Cl.³ G08C *21/00*

U.S. Cl. 178—18 **3 Claims**



1. An input device, comprising: an insulator sheet; a first resistor layer formed uniformly on said insulator sheet; a plurality of terminal leads formed at opposite ends of said first resistor layer; an elastic, flexible insulator spacer mounted on said first resistor layer and having a conductive element embedded therein; a second resistor layer formed on said insulator spacer; a plurality of second terminal leads connected to those opposite ends of said second insulator layer which extend perpendicularly to said opposite ends of said first resistor layer, and an insulator protective sheet mounted to cover an upper surface of said second resistor layer; a position in coordinates in two intersecting axial direction being detected from potentials associated with the position of contact of said conductive element with said first and said second resistor layers.

4,503,287

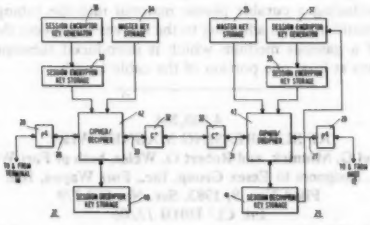
TWO-TIERED COMMUNICATION SECURITY EMPLOYING ASYMMETRIC SESSION KEYS

C. Carson Morris, Broad Run; Barry H. Bielsker, Vienna, both of Va., and Donald A. Cole, Rockville, Md., assignors to Analytics, Inc., Willow Grove, Pa.

Filed Nov. 23, 1981, Ser. No. 323,931

Int. Cl.³ H04L *9/02*

U.S. Cl. 178—22.08 **12 Claims**



12. A method for transmitting data in a secure manner between a terminal and a host comprising:

generating a terminal session encryptor key at said terminal;

encrypting said terminal session encryptor key under a master key;

transmitting said master key encrypted terminal session encryptor key to said host;

decrypting said master key encrypted terminal session encryptor key at said host to form a host session decryptor key;

automatically generating a host session encryptor key upon receipt of said master key encrypted terminal session encryptor key, said host session encryptor key being different from said terminal session encryptor key;

encrypting said host session encryptor key under said master key;

transmitting said master key encrypted host session encryptor key to said terminal;

decrypting said master key encrypted host session encryptor key at said terminal to form a terminal session decryptor key; and

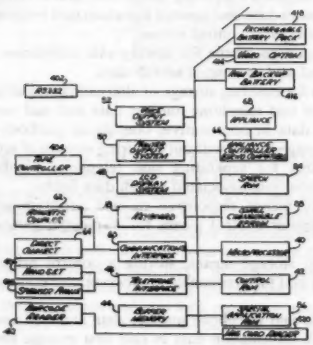
thereafter transmitting data from said terminal to said host under said terminal session encryptor key and from said host to said terminal under said host session encryptor key.

4,503,288

INTELLIGENT TELEPHONE

Bayard F. Kessler, Woodland Hills, Calif., assignor to Novation, Inc., Chatsworth, Calif.

Filed Aug. 31, 1981, Ser. No. 298,105
Int. Cl.³ H04M *11/00, 1/274, 1/65, 11/04*
U.S. Cl. 179—2 DP **18 Claims**



1. A self contained portable communication system for coupling to a telephone line comprising:

a keyboard terminal housing;

a microprocessor located within said keyboard terminal housing;

real time means, coupled to said microprocessor;

a keyboard located on said keyboard terminal housing and having a plurality of alphanumeric data entry keys comprising a full alphanumeric key set in a nonorthogonal typewriter array in communication with said microprocessor;

memory means located within said key board terminal housing and in communication with said microprocessor for storing a program for controlling the operation of said microprocessor;

random access memory means in communication with said microprocessor for temporary storage of data;

telephone line interface means for coupling to a phone line, said telephone line interface means being means for receiving electrical signals from and providing electrical signals to a phone line, including an off hook signal to maintain a phone line connection;

a telephone handset having a speaker for converting electrical signals to audio signals and a microphone for converting audio signals to electrical signals to be provided to said phone line;

a one line display means, mounted in said keyboard terminal housing and coupled to said microprocessor;

at least one appliance control device in communication with said microprocessor and in communication with at least one appliance;

whereby a user may depress data entry keys to enter data into said random access memory to cause said microprocessor to compute the cost of a telephone call placed through said communication system and to display the total cost on the display at the end of the phone call.

10. A self contained communication system comprising:

a keyboard terminal housing;

a microprocessor located within said keyboard terminal housing:

a real time means coupled to said microprocessor;

a keyboard located on said keyboard terminal housing and having a plurality of alphanumeric data entry keys in communication with said microprocessor;

memory means located within said keyboard terminal housing and in communication with said microprocessor for storing a program for controlling the operation of said microprocessor;

random access memory means in communication with said microprocessor for temporary storage of data;

telephone line interface means for coupling to a phone line, said telephone line interface means being means for receiving electrical signals from and providing electrical signals to a phone line, including an off hook signal to maintain a phone line connection;

a telephone handset having a speaker for converting electrical signals to audio signals and a microphone for converting audio signals to electrical signals to be provided to said phone line;

a one line display means, mounted in said keyboard terminal housing and coupled to said microprocessor; and

a speech synthesizer including a speaker located within said keyboard terminal housing and in electrical communication with said microprocessor;

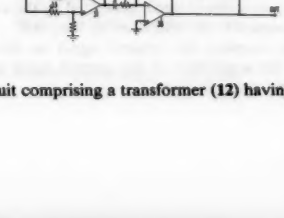
whereby depression of a data entry key will enter data to said microprocessor, which data may thereafter be converted by said speech synthesizer to tones of synthesized speech and transmitted over said speech synthesizer speaker; and whereby depression of a preselected set of data entry keys will instruct said system to speak the identity of keys depressed and to also decode and speak coded incoming messages letter by letter or word by word if the words are stored in the said memory means.

4,503,289

LINE CIRCUIT WITH FLUX COMPENSATION AND ACTIVE IMPEDANCE TERMINATION

Dewayne A. Spires, Plaistow, N.H., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 17, 1983, Ser. No. 458,276
Int. Cl.³ H04B *1/58;* **H04F** *19/02, 27/42*
U.S. Cl. 179—16 F **6 Claims**



1. A circuit comprising a transformer (12) having a primary

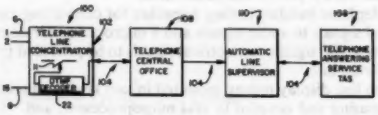
winding (13) and a secondary winding (14), a low resistance (15) connected in series with the primary, means (17) coupled to said resistance for developing a direct current control voltage, means (23) responsive to said control voltage for causing a direct flow in said secondary which serves to substantially cancel the flux induced in the transformer core by any direct current flow in the primary, and means (31-36, 23) coupled across the primary winding for developing an alternating current control signal which is delivered to said secondary to create a predetermined alternating current termination impedance.

4,503,290

AUTOMATIC LINE SUPERVISOR FOR USE WITH A CALL CONCENTRATOR

Kendall E. Post, and Paul N. Henning, both of Madison, Wis., assignors to Amtel Communications, Inc., Madison, Wis.

Filed Apr. 19, 1982, Ser. No. 369,912
Int. Cl.[3] H04M *3/50*; H04Q *3/60*
U.S. Cl. 179—18 FC **3 Claims**



1. An automatic line supervisor for use with a call concentrator which concentrates a plurality of incoming telephone lines onto an output which is coupled to a telephone tie line equipped with automatic ring-down running between the call concentrator and an answering service, the concentrator having switching means which upon opening permits disconnection of the call concentrator from the incoming telephone lines and from the telephone tie line to permit the concentrator to ring the answering service, the automatic line supervisor comprising:

(a) means for monitoring the telephone tie line running between the concentrator and the telephone answering service which senses when an operator station at the telephone answering service goes on hook, the condition of the operator station going on hook being sensed by current monitoring means for monitoring the magnitude of current flow in the telephone tie line, and the sensing of the operator going on hook being detected when the magnitude of such current flow drops below a threshold;

(b) means responsive to the means for monitoring for producing a control signal when it is sensed that the operator station has gone on hook, the means for producing a control signal being a tone generator;

(c) a switching means having an input and an output, the input being coupled to the output of the tone generator and the output being coupled to the telephone tie line, the switching means being open when the operator station is off hook at the answering service and closing in response to the sensing of the operator station going on hook, whereby the control signal generated by the tone generator is coupled to the telephone tie line; and,

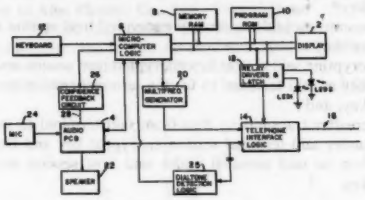
(d) means coupling the control signal to the switching means, the application of the control signal causing the switching means to open.

4,503,291

REPERTORY DIALER WITH EFFICIENT DATA STORAGE

Ernest von Holten, Wakefield, Mass., and Robin C. Moseley, Allentown, Pa., assignors to DASA Corporation, Andover, Mass.

Continuation of Ser. No. 441,037, Nov. 12, 1982, abandoned.
This application Jun. 12, 1984, Ser. No. 619,401
Int. Cl.[3] H04M *1/26*
U.S. Cl. 179—90 AN **21 Claims**



1. Repertory dialer comprising:

(a) programmable microcomputer control means for controlling operation of said dialer;

(b) dialing means in circuit with said programmable microcomputer control means for providing dialing signals to a telephone circuit;

(c) input means for inputing telephone number data, associated search data, and control signals to said programmable microcomputer control means;

(d) first storage means for storing said telephone number data and said associated search data:

(e) means for enabling storage of alternating, variable length fields of said telephone number data and said associated search data in consecutive, contiguous portions of said first storage means without requiring storage of separating characters for separating said telephone number data fields from said associated search data fields;

(f) display means responsive to said programmable microcomputer control means for displaying various data; and

(g) second storage means, storing a control program for causing said programmable microcomputer control means to:

(1) store said telephone number data and said associated search information data in said first storage means responsive to a first input control signal, and

(2) access particular stored data responsive to a second input control signal and particular input search information data.

4,503,292

CAMMED LATCHING SYSTEM FOR LOUDSPEAKER AND GRILLE

William K. Johnson, Fort Collins, Colo., and Jaime Ferrero, Chicago, Ill., assignors to International Jensen Incorporated, Schiller Park, Ill.

Filed Oct. 18, 1982, Ser. No. 435,086
Int. Cl.[3] H04N *1/02*
U.S. Cl. 179—178 **20 Claims**

1. A loudspeaker assembly comprising:

a. a loudspeaker, said loudspeaker comprising at least one mounting surface adapted to mount the loudspeakers to a mounting panel

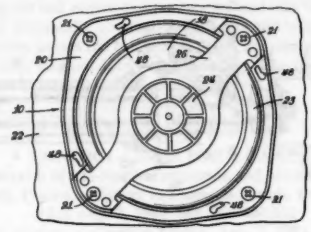
b. a loudspeaker grille;

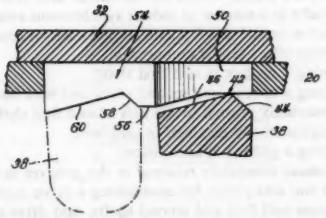
c. at least one latch member extending from one of said loudspeaker and said grille, said latch member comprising a lock receiving means shaped therein,

d. a latch-engaging portion in the other of said loudspeaker and said grille, said latch-engaging portion comprising an aperture shaped to receive said latch member and to ac-

commodate translation of said latch member within said aperture and a locking means shaped to engage said lock receiving means, said aperture cooperating with said locking means and lock receiving means to guide translation of said lock receiving means during attachment and disattachment of said grille and loudspeaker;

e. said locking means and said lock receiving means comprising means for connecting said latch member to said latch-





engaging portion, said locking means and said lock receiving means cooperating to attach said grille to said loudspeaker and to disattach said grille from said loudspeaker in response to forces applied to said grille substantially in a plane parallel to said loudspeaker mounting surface, said locking means and said lock receiving means further cooperating to require less force to engage said locking means and said lock receiving means than to disengage said locking means and said lock receiving means.

4,503,293

INTERLOCKING PLUG AND RECEPTACLE MECHANISM WITH ACTUATING MEANS

George W. Knecht, Brooklyn, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Dec. 17, 1982, Ser. No. 450,808

Int. Cl.³ H01H *9/20*

U.S. Cl. 200—50 B **21 Claims**

1. An actuating mechanism for operating a circuit breaker and other electrical device which is environmentally isolated from the atmosphere, the mechanism comprising:

an enclosure including an electrical plug receiving receptacle;

a circuit breaker having a toggle switch lever which is selectively positionable in "on", "off", "trip", and "reset" positions, the circuit breaker being disposed in environmental isolation within the enclosure and being electrically connected with the receptacle; and,

an actuating linkage means for operatively connecting the toggle switch lever with an operating handle which is movably mounted on the exterior of the enclosure, the actuating linkage means connecting the operating handle with the toggle switch lever with a first mechanical advantage when the toggle switch lever is adjacent the "on" position and with a second mechanical advantage when the toggle switch lever is adjacent the "reset" position, the first mechanical advantage being less than the second mechanical advantage, whereby the first mechanical advantage facilitates the movement of the operating handle by the toggle switch lever when the circuit breaker is tripped and the second mechanical advantage facilitates resetting the circuit breaker.

4,503,294

KEYBOARD SWITCH

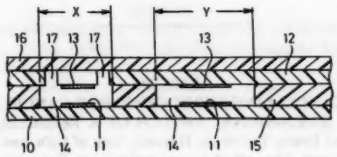
Akihiko Matsumaru, Ibaraki, Japan, assignor to Nippon Mektron Ltd., Japan

Filed Nov. 28, 1983, Ser. No. 555,820

Claims priority, application Japan, Dec. 30, 1982, 57-232894

Int. Cl.³ H01H *13/70*

U.S. Cl. 200—5 A **8 Claims**



1. A membrane keyboard including:

first electrical circuit means having a plurality of first switch contacts;

second electrical circuit means having a plurality of second switch contacts, and defining a switch sheet;

insulating spacer means between said first and second electrical circuit means, said spacer means having a plurality of openings at locations corresponding to the locations of said first and second switch contacts, said openings defining switch motion cavities and wherein said switch motion cavities define switch operational areas of varying size wherein at least one of said switch operational areas is smaller than said other of said switch operational areas; and

at least one slit through said switch sheet disposed above at least one of said switch motion cavities which defines said smaller switch operational area wherein the force for actuating said smaller switch operational area is reduced.

4,503,295

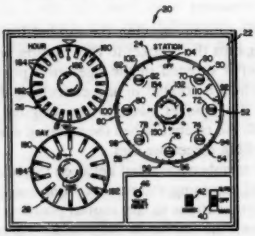
SPRINKLER CONTROLLER

Robert E. L. Whitten, Jr., Dallas, Tex., assignor to Telsco Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 392,318, Jun. 25, 1982, abandoned. This application Apr. 30, 1984, Ser. No. 605,976

Int. Cl.³ H01H *43/00*

U.S. Cl. 200—35 R **23 Claims**



1. A switch control mechanism comprising:

a carrier dial mounted for movement relative to a control

switch, said dial comprising a front plate, an intermediate plate and a back plate with one switch plate being positioned between the front plate and intermediate plate and the adjacent switch plates being positioned between the intermediate plate and the back plate;

switch plates spaced around the circumference of said dial and mounted for movement with said dial and having means for engaging the control switch as the carrier dial is moved relative thereto, said switch plates being movable relative to said dial and supported by said dial to permit one plate to move to a position overlying an adjacent switch plate, thereby permitting the reduction in size of the carrier dial while maintaining a predetermined range of movement for the switch plates relative to said dial; and

means for guiding said switch plates as said switch plates are moved relative to the dial carrier.

4,503,296

SELF-CANCELLING MECHANISM FOR CANCELLING A TURN-SIGNAL SWITCH OF A VEHICLE

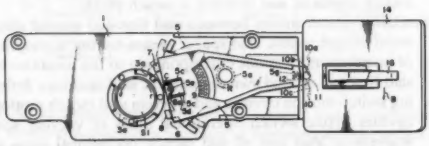
Masayosi Iwata; Yoshikazu Hayashi, both of Gifu, and Tadashi Yokoyama, Mie, all of Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed May 17, 1983, Ser. No. 495,447

Claims priority, application Japan, May 20, 1982, 57-73720

Int. Cl.³ H01H *3/16*

U.S. Cl. 200—61.27 **20 Claims**



1. A self-cancelling mechanism for cancelling blinking of turn-signal lamps of a vehicle, mounted on a steering column receiving therein a steering shaft fixed at its forward end portion with a steering wheel and used for a turn-signal device signalling a change of a running direction of the vehicle comprising:

(a) a bracket rotated by an operation of a driver;

(b) a detent means keeping the bracket in its original position or in one of a pair of operation positions in response to the operation of the driver;

(c) a turn-signal switch respectively switched on or off in accordance with movement to the pair of operation positions of the bracket;

(d) a ratchet pivotally supported to the bracket and rotatable from a neutral position against the bracket to a pair of rotation positions situated on both sides of the neutral position;

(e) a cancelling means moving the ratchet from the neutral position against the bracket to the rotation position, when the bracket is situated in the operation position and the steering wheel is rotated in anti-cancelling direction, and returning the bracket back to the original position together with the ratchet, when the steering wheel is rotated in a cancelling direction; and

(f) an elastic member provided between the bracket and the ratchet and returning the ratchet from one of the pair of the rotation positions to the neutral position by its elastic force to keep the ratchet in the neutral position, whereby the ratchet is returned back to the neutral position without causing the ratchet to abut on the bracket so as not to cause striking noise.

4,503,297

STEERING EFFORT SENSOR

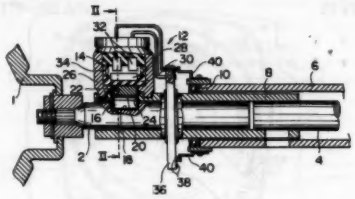
Eiji Yagi, Ayase; Yukiyoshi Hatori, Tokyo, and Yuji Kobari, Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama City, Japan

Filed Dec. 8, 1982, Ser. No. 447,886

Claims priority, application Japan, Dec. 21, 1981, 56-206686

Int. Cl.³ H01H *3/16*

U.S. Cl. 200—61.39 **16 Claims**



1. In an apparatus

a first rotatable shaft;

a second rotatable shaft; and

a rotation effort sensor which interconnects said first and second shafts in a manner to induce synchronous rotation thereof when one of said first and second shafts is rotated, said rotation effort sensor comprising:

means defining a groove in said first shaft;

means defining a bore in said second shaft; and bore having an axis essentially normal to the axis of said first shaft;

a piston reciprocatively disposed in said bore;

means defining a groove in said piston;

a rolling element constantly retained in the grooves in said first shaft and said piston for establishing a drive connection between said first and second shafts, said drive connection being such as to displace said piston within said bore while inducing synchronous rotation of said first and second shafts when one of said first and second shafts is rotated; and

a switch responsive to a predetermined displacement of said piston within said bore.

4,503,298

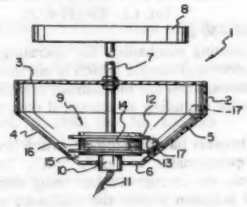
WHEEL MOTION INDICATOR

Andrew M. Garford, 10755 - 164 St., Edmonton, Alberta, Canada T5P 3S1

Filed Oct. 31, 1983, Ser. No. 547,363

Int. Cl.³ H01H *3/16, 35/10*

U.S. Cl. 200—61.39 **6 Claims**



1. A device for sensing wheel rotation for use in an electrical circuit of the type including a motion indicator, said device comprising a casing, said casing including a substantially cylindrical side wall a top wall closing the upper end of said side wall, and ramp means at the lower end of said side wall; said ramp means being inclined downwardly and inwardly toward the longitudinal axis of said casing; shaft means connected to

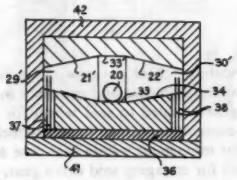
said top wall for driving connection with a wheel, whereby rotation of the wheel causes rotation of said shaft means and of said casing; contact means in said casing at the lower end of said ramp means, said contact means including first and second spaced apart electrically conductive elements for separate electrical connection with said motion indicator; and an electrically conductive ball in said casing movable between the top and bottom ends of said ramp means whereby when the wheel is rotating the ball moves to a position on said side wall remote from said electrically conductive elements and when rotation of said wheel ceases the ball moves down the ramp means into contact with said conductive elements to close the electrical circuit and actuate said indicator.

4,503,299

CONTROL-LEVER FOR A GAME

José Henrard; Marie-Noëlle Jacquemin, and Michel Leduc, all of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Aug. 2, 1982, Ser. No. 404,493
Claims priority, application France, Aug. 7, 1981, 81 15364
Int. Cl.³ H01H *35/02*
U.S. Cl. 200—61.52 **3 Claims**



1. A control stick for a game comprising:

a housing;

support means within said housing having a frusto-conical surface with a flattened central area defining a rest area with at least four channels in said frusto-conical surface displaced from each other by 90° and inclined with respect to the horizontal when said housing is in a reference orientation and extending from common rest position at said rest area;

detecting means mounted at a position of each said channel remote from said common rest position for each indicating displacement of said stick in one of four directions;

a ball within said housing for rolling movement along any of said channels from said rest position in response to manual movement of said housing from said reference orientation and for causing a different control signal to be produced when said ball rolls into contact with each one of said detecting means.

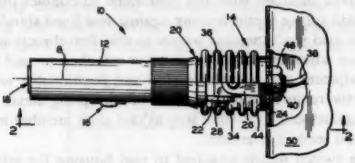
4,503,300

CONTROL ASSEMBLY WITH MULTI-AXIS MOUNTING CONNECTION

Wendell C. Lane, Jr., Laurinburg, N.C., assignor to Dana Corporation, Toledo, Ohio

Filed Aug. 3, 1983, Ser. No. 519,948
Int. Cl.³ H01H *9/00*
U.S. Cl. 200—61.54 **9 Claims**

1. A vehicular speed control switch assembly comprising a control switch including a housing, a mounting base, and a mounting connection adjustably connecting said housing with said base, said mounting connection comprising (1) means for permitting orientation of said housing in at least two orthogonal planes of movement relative to said mounting connection, said means comprising said mounting base, first and second yokes, and a cross member joining said yokes together, said first yoke affixed to said housing, said second yoke affixed to said mounting base, and (2) means for locking said housing into a selected orientation, said means for locking said housing



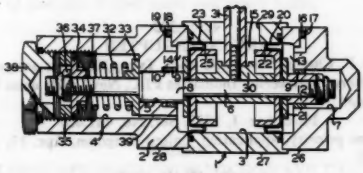
being sufficient to effect securement of said housing relative to said base during normal utilization of said control switch.

4,503,301

DIFFERENTIAL FLUID PRESSURE SWITCH

Ronald C. Kurtz, Irwin, Pa., assignor to American Standard Inc., Wilmerding, Pa.

Filed Mar. 24, 1983, Ser. No. 478,436
Int. Cl.³ H01H *35/40*
U.S. Cl. 200—83 D **18 Claims**



1. A fluid pressure switch for detecting a fluid pressure differential between multiple fluid pressure sources, said fluid pressure switch comprising:

(a) a housing having a cylindrical bore formed in one end, a spring housing bore formed in the opposite end, and a first guide bore formed intermediate said cylindrical bore and said spring housing bore;

(b) a shaft member coaxially disposed within said housing, extending into said cylindrical bore, said first guide bore, and said spring housing bore, said shaft member being axially movable within said housing;

(c) a piston member fixedly mounted on the portion of said shaft member located in said cylindrical bore, said piston member having opposing first and second surfaces formed on respective first and second cup-shaped portions coaxially disposed on said shaft member, and an extension collar coaxially disposed on said shaft member between said first and second cup-shaped portions;

(d) passageway means in said housing for communicating fluid pressure sources to respective opposing surfaces of said piston, such that such fluid pressures act on said piston member such that the differential pressure causes axial movement of said shaft member in a first direction toward said spring housing bore upon higher fluid pressure on the first surface of said piston member and a second direction, away from said spring housing bore, upon higher fluid pressure on the second surface of said piston member;

(e) a fixed shoulder stop formed on said shaft member adjacent said piston member;

(f) an adjustable stop coupled to the end of said shaft member adjacent said spring housing bore, said adjustable stop being axially spaced apart from said fixed shoulder stop;

(g) spring means disposed between said fixed shoulder stop and said adjustable stop for providing a biasing force against said fixed shoulder stop upon movement of said shaft member in said first direction, and against said ad-

justable stop upon movement of said shaft member in said second direction;

(h) an abutting portion formed in said housing adjacent said fixed shoulder stop and positioned to contact the end of said spring means bearing against said fixed shoulder stop as said shaft member moves in said first direction;

(i) an adjustable abutting member attached to said housing adjacent said adjustable stop and positionable within an axial range to contact the end of said spring means bearing against said adjustable stop as said shaft member moves in said second direction;

(j) a switch means attached to said housing for selectively providing an electrical connection indicating the pressure relationship between fluid pressure sources; and

(k) a switch operator means extending from said piston member for engaging said switch means in response to axial movement of said piston member, said switch operator means having an elliptically-shaped eccentric portion extending from said extension collar and being movable along therewith, said eccentric portion being axially rotatable such that a range of displacement of said shaft member over which said switch means operates is provided.

4,503,302

ARC INTERRUPTER

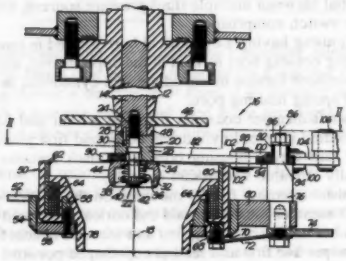
George F. Chrisp, Newcastle upon Tyne, England, assignor to Northern Engineering Industries PLC, NewCastle upon Tyne, England

Filed Apr. 1, 1983, Ser. No. 481,457

Claims priority, application United Kingdom, Apr. 17, 1982, 8211203

Int. Cl.³ H01H *33/18*

U.S. Cl. 200—147 R **14 Claims**



1. An arc interrupter comprising a fixed contact and a fixed electrode which provide, respectively, first and second coaxial arcing surfaces separated by an annular gap, said first arcing surface being closer to the common axis of said arcing surfaces than said second arcing surface, an arc-driving coil coaxial with said arcing surfaces, said coil being electrically connected at one end to said electrode, structure means defining a pivot axis and a movable contact which is mounted on said structure means for angular movement about said pivot axis between a make position in which said movable contact extends from said pivot axis towards said common axis and is in engagement with said fixed contact and in which said movable contact is included in an openable main current path and a break position in which said movable contact is disengaged from said fixed contact and the least distance between said contacts is greater than said gap, said coil being included in series with said arcing surfaces in an arc current path during a later part of movement of said movable contact from said make position to said break position.

4,503,303

MINIATURE ELECTRICAL SWITCH

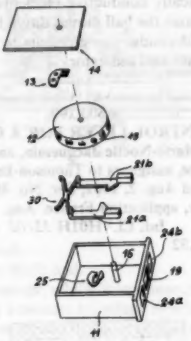
Claude Fourcaulx, Chelles, and Bernard Fourcaulx, Le Raincy, both of France, assignors to Atelier de Mecanique de Precision F.M., La Ferriere, France

Filed Mar. 4, 1983, Ser. No. 472,033

Claims priority, application France, Jul. 28, 1982, 82 13156

Int. Cl.³ H01H *3/34*

U.S. Cl. 200—156 **9 Claims**



1. In an electrical switch of the type comprising a case, a wheel disposed within said case and rotatably movable about an axis, a drive gear coupled to said wheel for rotating said wheel, a contact element connected to said wheel, at least one pusher coupled for movement within said case and including an end and a tooth for engaging said drive gear, and a return means for engaging said end and urging said pusher away from said drive gear, the improvement in said return means comprising:

a flexible material constructed to have substantially the configuration of an X to form four legs, two adjacent legs having ends constructed and arranged to engage a fixed part of said case and at least one of the other of said four legs having an end physically located between the end of said at least one pusher and said fixed part of said case.

4,503,304

INDUCTIVE HEATING DEVICE HAVING A PLURALITY OF HEATING COIL UNITS

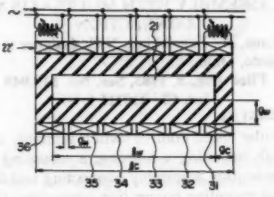
Toru Hoshikawa, Kagawa, and Yoshihiko Osaki, Hyogo, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo and Toyo Tanso Co., Ltd., Osaka, both of, Japan

Filed Apr. 5, 1982, Ser. No. 365,849

Claims priority, application Japan, Apr. 7, 1981, 56-53365; Apr. 7, 1981, 56-53366

Int. Cl.³ H05B *6/44*

U.S. Cl. 219—10.49 R **3 Claims**



1. In combination with an inductive heating device, a stationary workpiece having a predetermined length, said inductive heating device comprising, a heating means comprised of a plurality of cylindrical heating coil units, said cylindrical

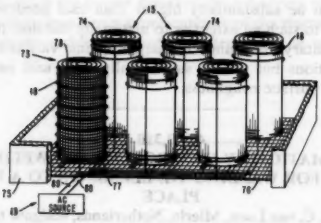
heating coil units being disposed adjacent each other in the longitudinal direction of said inductive heating device so as to surround said workpiece; a common AC power source to which said plurality of cylindrical heating coil units are connected in parallel; and heat insulating means disposed between said heating means and said workpiede; said heating means being longer than said predetermined length of said workpiece and said heating means and said workpiece being disposed in such a manner that the distance (gc) between each end portion of said workpiece and each end of said heating means in the longitudinal direction is smaller than the spacing (gw) between said heating means and said workpiece.

4,503,305

ELECTROMAGNETIC INDUCTION AIR HEATER

George C. Virgin, North Rd., Tivoli, N.Y. 12583

Division of Ser. No. 104,367, Dec. 17, 1979, Pat. No. 4,341,936.
This application Jan. 15, 1982, Ser. No. 339,408
Int. Cl.³ H05B 6/10
U.S. Cl. 219—10.51 1 Claim



1. An electromagnetic induction air heater element adapted for connection to a source of alternating electrical current including:

a cylindrical, loose roll of magnetizable wire mesh screen, adjacent layers of said magnetizable wire mesh screen being spaced apart to permit axial flow of air therethrough;

an induction heating coil surrounding said cylindrical, loose roll of magnetizable wire mesh screen, the opposite ends of said coil adapted for connection to the source of alternating electrical current;

one or more additional loose rolls of magnetizable wire mesh screen surrounding said induction heating coil;

a further induction heating coil surrounding each said one or more additional loose rolls of magnetizable wire mesh screen, each said further induction heating coil being connected in parallel to other of said induction heating coils; and

a forced air heating duct section surrounding all of said cylindrical, loose rolls of magnetizable wire mesh screen, said forced air heating duct section including an opening for providing access to said opposite ends of said induction heating coils.

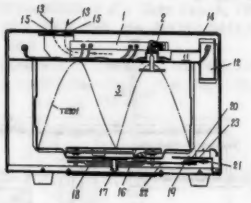
4,503,306

HIGH FREQUENCY HEATING APPLIANCE

Tomotaka Nobue, and Shigeru Kusunoki, both of Yamatokoriyama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP82/00135, § 371 Date Dec. 22, 1982, § 102(e) Date Dec. 22, 1982, PCT Pub. No. WO82/03743, PCT Pub. Date Oct. 28, 1982
PCT Filed Apr. 22, 1982, Ser. No. 459,541
Claims priority, application Japan, Apr. 24, 1981, 57-62865
Int. Cl.³ H05B 6/64
U.S. Cl. 219—10.55 F 2 Claims

1. A high-frequency heating appliance comprising: a solid-state high-frequency wave generating heat source; upper and lower walls, widthwise extending side walls, and depthwise extending side walls, defining a heating chamber for receiving an object of heating; and a door pivotably mounted in one of said widthwise extending side walls for opening and closing said heating chamber; said solid-state high-frequency wave generating heat source having a predetermined resonant frequency in the 915 MHz band, said heating chamber having a



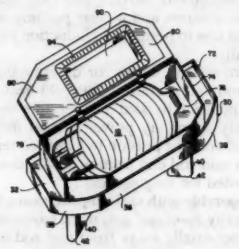
volume such that only the TE_{201} mode having no standing wave in the vertical direction in the heating chamber is produced in said band, said high-frequency heat source being located in one of said upper and lower walls, remote from the pivot support for said door with respect to substantially the middle of said one of said upper and lower walls.

4,503,307

SHIELDING APPARATUS FOR MICROWAVE THAWING

Nancy L. Campbell; John G. Pinto; John A. Drewe; Patrick D. Hayes, all of San Diego, and Nelson Robert A., La Mesa, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 20, 1983, Ser. No. 505,584
Int. Cl.³ H05B 6/64; A61M 1/03
U.S. Cl. 219—10.55 E 6 Claims



1. A shielding apparatus for containing frozen blood bags during microwave thaw comprising:

a metallic box for receiving a blood bag, the box having a bottom and sides;

a metallic lid;

hinge means pivotally mounting the lid to the box for enclosing the blood bag therein the hinge means including:

a plurality of vertical slots in a side of the box;

a plurality of hinges mounted in the slots and adjustable up and down in the slots to various positions; and

means connected to the hinges for fixing the positions of the hinges in the slots; and

the lid having an aperture for allowing microwaves to enter the box and thaw the blood in the blood bag.

4,503,308

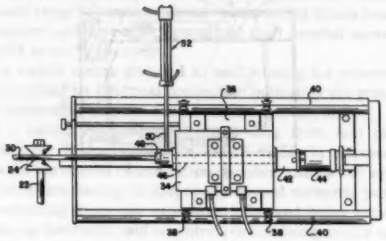
APPARATUS FOR PREPARING ROD STOCK FOR FORGING IN MANUFACTURE OF SUCKER RODS

Robert T. Woodings, Box W, Mars, Pa. 16046

Filed Apr. 29, 1982, Ser. No. 372,965

Int. Cl.³ H05B *5/00, 6/00*

U.S. Cl. 219—10.73 **2 Claims**



1. In an apparatus for heating an end portion of a steel rod preparatory to forging thereof in the manufacture of sucker rods, the combination comprising:

support means for supporting a rod in alignment with an axis;

delivery means for delivering a rod laterally of said axis to said support means;

a stop means which is selectively positionable at an operative position on said axis;

said delivery means comprising carousel means for capturing a first rod while simultaneously delivering a second rod to said support means for advance against said stop means;

rod advancing means for moving the rod along said axis and into endwise engagement with said stop means to position an end portion of the rod for heating thereof;

an induction heater having a heating cavity adapted to receive said rod end portion therewithin;

said induction heater being supported for movement along said axis past the axial location of said stop means toward and away from the rod to selectively encompass said rod end portion within said heating cavity;

means for selectively moving said stop means between said operative position and a clear position laterally removed from said axis to permit said induction heater to be moved therepast;

temperature-sensing means for determining the temperture of said rod end portion within said heating cavity;

means responsive to said temperature-sensing means for selectively supplying power to said induction heater to bring said rod end portion to a desired temperature and to maintain said rod end portion at said desired temperature until needed for forging; and

means cooperable with said support means for delivering the rod laterally from said axis upon movement of said induction heater axially away from said rod end portion.

4,503,309

EDM METHOD AND APPARATUS WITH SUCCESSIVE TRAINS OF INTERMITTENTLY ENLARGED ELEMENTARY PULSES

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Jul. 12, 1979, Ser. No. 56,856

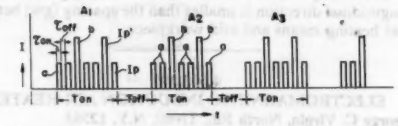
Claims priority, application Japan, Jul. 21, 1978, 53-89648; Sep. 18, 1978, 53-114933

Int. Cl.³ B23P *1/08*

U.S. Cl. 219—69 M **16 Claims**

1. A method of the electrical-discharge-machining of a workpiece juxtaposed with a tool electrode across a fluid-filled machining gap, the method comprising the steps of:

applying across said machining gap a succession of machining pulse trains individually consisting of elementary machining pulses of predetermined on-time τon and off-time τoff, the machining pulse trains having a duration Ton with the successive trains being separated by a cut-off time interval Toff, said elementary machining pulses in each train being substantially uniform in energy consumption and having a predetermined value of individual peak current Ip multiplied by individual on-time τon preset to



yield a particular EDM surface roughness when applied in said train; and

modifying at least one of said elementary pulses in each train to increase its peak current Ip multiplied by its on-time τon to be substantially higher than said predetermined value to such an extent as to materially stabilize resulting elementary machining discharges against variation in gap conditions but not to substantially alter said particular EDM surface roughness.

4,503,310

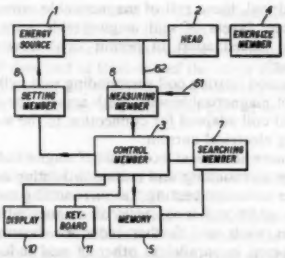
AUTOMATICALLY CONTROLLED ARC-WELDING DEVICE FOR WELDING TIE ELEMENTS TO A WORK PLACE

Martien K. C. van Loon, Mierlo, Netherlands, assignor to Weld-Equip B.V., Helmond, Netherlands

Filed Mar. 11, 1983, Ser. No. 474,499

Int. Cl.³ B23K *9/20*

U.S. Cl. 219—98 **13 Claims**



1. An arc welding device for welding tie elements to a work piece comprising an electric energy source, a welding head connected to the electric energy source and provided with means for receiving at least one tie element, means for positioning the welding face of the tie element with respect to the welding spot on the work piece and means for exerting pressure between the tie element and the work piece, a control-member for determining the energy to be dispensed by the electric energy source, an energizing member for establishing an arc striking circuit between the electric energy source, a memory member connected to the control-member for storing data indicating the relationship between the energy to be dispensed by the electric energy source and a set of welding parameters, a measuring member connected to the control-member for producing signals representative of said welding parameters, a searching member connecting to the control-member for selecting, in response to the signals of the measuring member, in the memory member the energy to be dispensed by the electric energy sorce and for producing a signal representative of the energy to be dispensed and a setting member connected to the control-member and to the electric energy source for setting, in response to the signal of the search

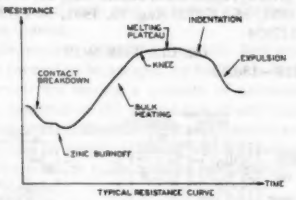
member, the electric energy source in a manner such that subsequent to actuation of the energizing member, said electric energy source gives off an output energy determined by the memory member, said measuring member being connected to said electric energy source so as to determine said output energy and including comparison means for comparing, during the welding operation, the output energy actually supplied with the energy determined by the memory member and readjusting means for readjusting the setting member in response to the result of the comparison by means of the control-member, said memory member storing data representing the voltage/-current characteristics of the electric energy source in dependence on the diameter or the surface of the welding face of the tie elements to be welded, said measuring member being provided with means connected through the control-member to the setting member for causing the electric energy source to produce a test current or a test voltage, and said measuring member comprising means connected to the output of the electric energy source for measuring the voltage or current in response to the test current or test voltage respectively, as a result of which the output signal of the measuring member for the searching member is representative of the diameter or the surface of the welding face of a tie element to be welded.

4,503,311

METHOD AND APPARATUS FOR DETECTING THE ONSET OF MELTING IN A RESISTANCE SPOT WELD

Albert F. Houchens, Rochester, Mich.; Basil A. Decina, Jr., McLean, Va.; James R. Havens, Sterling Heights, Mich.; Dixon Cleveland, Vienna, Va., and Gregory L. Nagel, Royal Oak, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 25, 1983, Ser. No. 498,063
Int. Cl.³ B23K *11/36*
U.S. Cl. 219—109 **6 Claims**



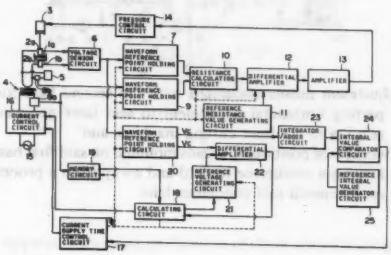
1. A method of detecting the approximate onset of melting in a resistance spot weld comprising the steps of:
- monitoring the weld resistance R and the electrical power P supplied to the weld,
- calculating the rate of change of resistance R and dividing by power to obtain the time varying function R/P representing the inverse specific heat of the weld,
- searching the function R/P to locate a maximum value representing the inverse specific heat for the weld at low temperature, and
- searching the function R/P subsequent to its maximum to determine when it reaches an empirically determined fraction of the maximum value which occurs upon an increase of specific heat accompanying the onset of workpiece melting, thereby identifying the time of the onset of melting.

4,503,312

METHOD AND APPARATUS FOR CONTROLLING RESISTANCE WELDING

Shuji Nakata, Toyonaka; Yoshio Kawaguchi, and Susumu Aono, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited and Nippon Avionics Co., Ltd., both of, Japan

PCT No. PCT/JP82/00222, § 371 Date Feb. 8, 1983, § 102(e) Date Feb. 8, 1983, PCT Pub. No. WO82/04413, PCT Pub. Date Dec. 23, 1982
PCT Filed Jun. 9, 1982, Ser. No. 466,348
Claims priority, application Japan, Jun. 10, 1981, 56-88009
Int. Cl.³ B23K *11/24*
U.S. Cl. 219—117.1 **8 Claims**



1. A method for controlling resistance welding comprising the steps of:
- holding the portion of a material to be welded between a pair of electrodes under a pressure;
- applying an initial current having a magnitude less than that of a welding current for said electrodes in advance of performing welding;
- detecting the resistance between said electrodes in the presence of said initial current;
- controlling the pressure on said electrodes on the basis of the detected resistance so as to adjust the resistance between said electrodes to a predetermined resistance;
- applying a welding current between said electrodes to perform resistance welding;
- detecting the voltage between said electrodes while the welding current is applied thereto;
- controlling the welding current flowing between said electrodes to adjust the voltage detected between said electrodes to a predetermined voltage; and
- measuring the period during which said welding current is applied and interrupting said welding current when said measured period reaches a predetermined time period.

4,503,313

RELATIVELY ADJUSTABLE LASER AND OPTIC SYSTEM FOR LASER PROCESSING

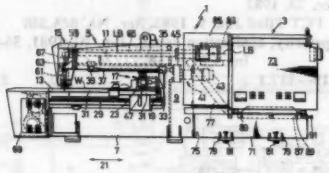
Akira Tsutsumi, La Mirada, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.

Filed Apr. 1, 1982, Ser. No. 364,269
Claims priority, application Japan, Apr. 7, 1981, 56-051311; Apr. 17, 1981, 56-057301; Apr. 28, 1981, 56-063323
Int. Cl.³ B23K *9/00*
U.S. Cl. 219—121 LG **11 Claims**

1. A relatively adjustable laser and optic system for laser processing comprising:
- a laser beam cutting machine for focussing a laser beam, including a first base for fixedly supporting an overhead beam by a post, the overhead beam having a laser beam conduit, a mirror assembly and a condenser lens for reflecting and focussing a laser beam;
- a laser generator supported on a second base for generating a laser beam and feeding the laser beam to said laser cutting machine, said laser generator having a laser beam

outlet arranged in alignment with an axis of said laser beam conduit in said overhead beam such that the laser beam generated by said laser generator is delivered from said laser generator to said mirror assembly in a straight line;

a connecting means for connecting said first base and said second base;



adjustment means associated with the second base for imparting horizontal adjustment to said laser generator in relation to the laser cutting machine; and

a workpiece positioning means mounted on said first base for feeding a workpiece toward and away from a processing zone beneath said condenser lens.

4,503,314

METHOD OF WELDING TITANIUM ALLOY PARTS WITH TITANIUM INSERT

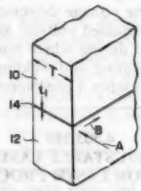
Tsuneo Kakimi, Tokyo; Megumi Nakanose, Sagamihara; Hiroshi Satoh; Takaharu Konishi, both of Tokyo; Hisanao Kita, Hitachi, and Takamitsu Nakazaki, Takahagi, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Hitachi, Ltd., Tokyo, both of, Japan

Filed Apr. 26, 1982, Ser. No. 371,734

Claims priority, application Japan, Apr. 30, 1981, 56-65577; Apr. 30, 1981, 56-65578

Int. Cl.³ B23K *15/00*

U.S. Cl. 219—121 ED **6 Claims**



1. In a method of welding opposite end surfaces of two aligned alpha-beta type titanium alloy parts by an electron beam welding, the improvement comprising closely interposing an insert member between said end surfaces of the two titanium alloy parts, the material of said insert member consisting essentially of 0-3% by weight of aluminum and the balance of titanium, and subjecting a weld joint obtained by the electron beam welding operation to a postwelding heat treatment which is a combination of a solid solution treatment comprising the substeps of heating said weld joint at a temperature in the range from about 800 degrees C. to about 1000 degrees C. and quenching the heated weld joint in a liquid, and a subsequent aging treatment comprising the substeps of heating the weld joint at a temperature in the range from about 400 degrees C. to about 680 degrees C. and cooling the heated weld joint.

4,503,315

SEMICONDUCTOR DEVICE WITH FUSE

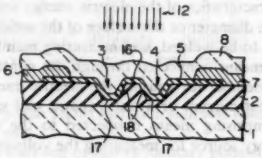
Hajime Kamioka, Yokohama; Mikio Takagi, Kawasaki; Noriaki Sato, Machida; Motoo Nakano, Yokohama, and Takashi Iwai, Hachioji, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 27, 1982, Ser. No. 453,099

Claims priority, application Japan, Dec. 28, 1981, 56-209766

Int. Cl.³ B23K *27/00*

U.S. Cl. 219—121 LE **10 Claims**



1. A semiconductor device with a fuse, comprising:

an insulating layer having at least one step, each said step having an upper surface, a lower surface and a slope connecting said upper surface and said lower surface;

a fusible film covering said step of said insulating layer;

a conduction line connected to said fusible film; and

a covering film formed on said fusible film and said conduction line, so that when a portion of said fusible film on said upper surface and said slope of said step is melted by irradiation with an energy beam, the melted portion of said fusible film flows from said upper surface of said step to said lower surface of said step via said slope and said fusible film is cut.

4,503,316

DC WELDING POWER SUPPLY SYSTEM

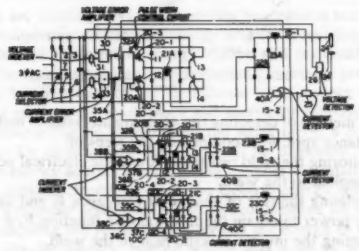
Kazuo Murase, Yokohama; Toshihiko Watanabe, Kamakura; Naoki Takeuchi, Chigasaki, and Tokuji Maruyama, Yokohama, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Aug. 12, 1982, Ser. No. 407,489

Claims priority, application Japan, Aug. 13, 1981, 56-127971; Aug. 13, 1981, 56-127972; Aug. 13, 1981, 56-127973; Aug. 13, 1981, 56-127974

Int. Cl.³ B23K *9/10*

U.S. Cl. 219—130.32 **7 Claims**



1. In a welding apparatus, an improved DC power supply system connected to a consumable or non-consumable electrode adapted for welding a work piece, said power supply comprising:

plural inverter units adapted to convert a first direct current into an alternating current and to rectify the alternating current to produce an output of a second direct current;

a circuit connecting the output terminals of said inverter units in parallel relation;

a detection circuit for detecting the total output current of said inverter units; and

a circuit for varying the number of operating inverter units according to the value of the detected total output current such that a ripple component of said total output current is minimized.

4,503,317

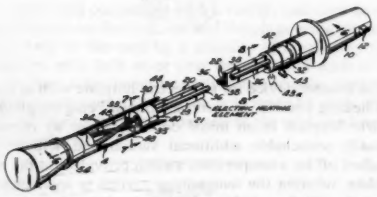
ELECTRIC STEAM GENERATING HAIR CURLING IRON AND METHOD OF USE THEREOF

Monica M. Mancillas, 780 Thrasher Way, Anaheim, Calif. 92807

Filed Nov. 4, 1983, Ser. No. 548,790

Int. Cl.³ H05B *3/00*; A45D *1/04*; F22B *1/28*

U.S. Cl. 219;225 **8 Claims**



1. A hair curling device for permanently curling hair comprising:

(a) a tubular mandrel for winding hair therearound, having first and second ends and including radially extending apertures therein;

(b) a handle portion extending from the first end of said mandrel formed to be grasped by the user's hand;

(c) a reservoir for storing a quantity of permanent wave solution mounted on the second end of said mandrel;

(d) a heating element disposed with said mandrel to heat said mandrel and to permit selective vaporization of permanent wave solution to be brought into contact with said heating element;

(e) rotatable means extending within said mandrel and including a heatable vaporization portion adapted to contact said heating element for transporting solution from said reservoir into said mandrel, said transporting means having a first and second rotational position, said first position spacing said vaporization portion from said heating element and said second position disposing said vaporization portion in contact with said heating element;

(f) means cooperating with said transporting means and maintained in torsion to continuously bias said vaporization portion to said first position; and

(g) an actuation lever operatively associated with said transporting means for selectively rotating said vaporization means from said first position to said second position, said mandrel, handle, reservoir, heating element, and solution transporting means formed of materials substantially inert to permanent wave solution stored within said reservoir.

4,503,318

APPARATUS FOR THE SPARK PERFORATION OF SHEET MATERIALS

Robert J. Hall, Flackwell Heath, Nr. High Wycombe, England, assignor to Wiggins Teape Group Limited, England

Continuation of Ser. No. 279,210, Jun. 30, 1981, Pat. No. 4,355,226. This application Sep. 28, 1982, Ser. No. 426,228

Claims priority, application United Kingdom, Jul. 8, 1980, 8022239

The portion of the term of this patent subsequent to Oct. 19, 1999, has been disclaimed.

Int. Cl.³ H05B *7/18*

U.S. Cl. 219—384 **19 Claims**

1. Apparatus for spark perforation of sheet material comprising spaced apart first and second electrodes which define between them a sparking zone through which sheet material to be perforated can be moved in a predetermined direction, and in which within said sparking zone, said electrodes have their closest parts substantially in a plane transverse to the direction of movement of the sheet material, one electrode extending substantially to one side of said transverse plane and the other said electrode extending substantially to the other side of said plane.

4,503,319

HEATER FOR HOT ISOSTATIC PRESSING APPARATUS

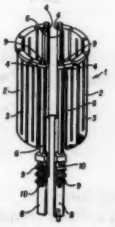
Masato Moritoki, Miki; Takao Fujikawa, Kobe; Kazuo Kitagawa, Kobe, and Junichi Miyanaga, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Nov. 22, 1982, Ser. No. 443,566

Claims priority, application Japan, Nov. 20, 1981, 56-173869[U]; May 17, 1982, 57-083874

Int. Cl.³ H05B *3/06*; F27B *5/14*; F27D *11/02*

U.S. Cl. 219—390 **6 Claims**



1. A heater assembly unit for use in HIP apparatus for treating at least one work item in a high temperature and high pressure gas atmosphere by isostatic application of pressure, said heater assembly unit comprising:

(a) two axially vertically disposed sinuous graphite heating elements each of which is composed of a plurality of longitudinal segments disposed in an array which is a portion of a cylinder in shape, each of said longitudinal segments extending the axial length of said heating ele-

ment, being connected to the adjacent longitudinal segment on one side at the top of said heating element and to the adjacent longitudinal segment on the other side at the bottom of said heating element by a circumferential segment of the graphite heating element, and being spaced from both adjacent longitudinal segments along the axial length thereof, whereby each of said heating elements is one continuous piece of graphite in grid-like form having axial slits therein which are open alternately at their upper and lower ends and which are closed at their opposite ends by one of said circumferential segments;

(b) a plurality of terminal end portions extending radially outwardly from the upper end of each of said graphite heating elements and being part of a circumferentially extending radial projection, each of said terminal end portions having a vertically disposed mounting hole therethrough;

(c) a pair of metallic retaining members having fins thereon for shielding radiation heat and holes therein for suppressing heat conduction;

(d) a vertically oriented support column fixedly erected on each of said metallic retaining members, each of said vertically oriented support columns having an upwardly disposed abutment surface which abuts the underside of one of said terminal end portions and a male screw portion at its upper end which protrudes through the mounting hole in said one of said terminal end portions, said support column serving as means for supplying electric power to said heating elements; and

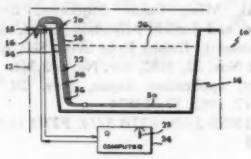
(e) securing means threaded onto the male screw portions of said support columns so as to abuttingly engage the upper surfaces of said terminal end portions.

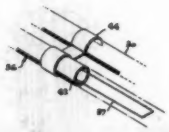
4,503,320

DEEP FAT COOKING TEMPERATURE CONTROL SYSTEM

Louis S. Polster, 1017 Fairmount Rd., Burbank, Calif. 91501

Filed May 19, 1978, Ser. No. 907,692
Int. Cl.³ F27D *11/00*
U.S. Cl. 219—441 **8 Claims**





1. A deep fat fryer comprising:

a deep fat vessel having a heater region adjacent the bottom thereof and a cooking region above said heater region;

a heater having a heating portion within said heater region to heat deep fat in said vessel;

a temperature-sensing probe having a unitary sensing portion within said vessel, said sensing portion comprising:

an upright leg portion positioned within said vessel above said heating portion and within said cooking region for sensing the temperature of the fat within said cooking region, and

a lower leg portion positioned within said vessel adjacent said heating portion and within said heater region for sensing the temperature of the fat within said heater region; and

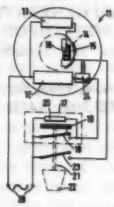
a thermal shunt interconnecting said lower leg portion of said temperature-sensing probe and said heating portion of said heater so that said sensing portion of said temperature-sensing probe senses and provides an output responsive to the combined temperatures of the cooking and heating regions of the fat and the heating portion of the heater.

4,503,321

CONTROL DEVICE FOR AN ELECTRIC HOTPLATE

Felix Schreder, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Gerate Blanc und Fischer, Fed. Rep. of Germany

Filed Nov. 10, 1982, Ser. No. 440,733
Claims priority, application Fed. Rep. of Germany, Nov. 10, 1981, 3144631; Dec. 15, 1981, 3149556
Int. Cl.³ H05B *3/68*
U.S. Cl. 219—449 **18 Claims**



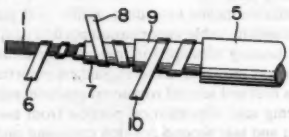
1. A control device for an electric hotplate with at least one load heating resistor, an increased power being supplied to the electric hotplate in an initial cooking phase by means of a manually switchable additional switch and which can be switched off by a temperature switch provided on the electric hotplate, wherein the temperature switch is so arranged and has such a high switching hysteresis that, after once being switched off, it is not switched on again in boiling, roasting and baking ranges during further operation of the electric hotplate.

4,503,322

HEAT SENSITIVE HEATER WIRE

Yoshio Kishimoto, Osaka, and Takeshi Hayashi, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 1, 1983, Ser. No. 557,115
Int. Cl.³ H05B *1/02*
U.S. Cl. 219—505 **11 Claims**



1. A heat sensitive heater wire comprising a conductor for a first electrode, an internal function layer on said first electrode, a conductor for a second electrode on said internal function layer, an external function layer on said second electrode, a conductor for a third electrode on said external function layer, and an insulating housing covering said third electrode, one of said internal function layer and said external function layer comprising a heat generating layer having self-temperature controllability, the other function layer comprising one of a

high-molecular temperature sensitive layer and a temperature fuse layer, whereby a heating current may be supplied to said heat generating layer via said second electrode and one of said first and third electrodes, and a temperature control current may be supplied to said other function layer via said second electrode and the other of said first and third electrodes to enable control of local overheating.

4,503,323

MACHINE READABLE PUNCH CARD

Frederick H. Flam, 2160 Century Park East -#1802N, Los Angeles, Calif. 90067

Filed Mar. 25, 1983, Ser. No. 478,662
Int. Cl.³ G06K *21/00*
U.S. Cl. 235—489 **2 Claims**

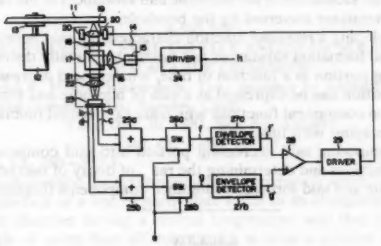
1. A punch card cooperable with a reader, said card having an array of plugs on the card, each of the plugs being joined to the main body of the card by a plurality of breakaway tabs, there being a pilot hole at or near the center of each of the plugs, the pilot holes being laterally offset to miss read windows of the companion reader, the hole made by each of the plugs at least partially intersecting one of the read windows of the companion reader.

4,503,324

AUTOMATIC FOCUSING DEVICE

Tsuneshi Yokota, Kawasaki, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 14, 1982, Ser. No. 388,505
Claims priority, application Japan, Jun. 18, 1981, 56-94424
Int. Cl.³ G01J *1/20*
U.S. Cl. 250—201 **7 Claims**



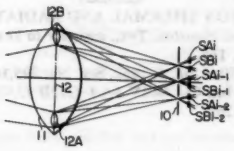
1. An automatic focusing device comprising:
a focusing optical lens system for focusing a reading light beam and, intermittently, a recording light beam on an optical disk which has a surface and pits;
an optical sensor for generating a plurality of photoelectric signals which correspond to different sections of a beam spot formed by a light beam reflected from the optical disk;
sampling means for sampling signal components corresponding to light reflected from the optical disk from the photoelectric signals generated by the optical sensor only when said recording light beam is not being generated, to thereby generate a plurality of component signals which correspond to at least two of the photoelectric signals;
detecting means for detecting the difference between said plurality of component signals generated by the sampling means, to thereby generate a difference signal representing the difference detected; and
control means for controlling the focusing lens system according to the difference signal generated by the detecting means.

4,503,325

APPARATUS FOR DETECTING VIBRATION BY COMPARING THE PHASE RELATION OF PORTIONS OF A DIVIDED LIGHT IMAGE

Kunihio Araki, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 117,628, Feb. 1, 1980, abandoned. This application Apr. 12, 1982, Ser. No. 367,458
Claims priority, application Japan, Feb. 9, 1979, 54-14011; Feb. 9, 1979, 54-14012
Int. Cl.³ G03B *3/00*; H01J *40/14*
U.S. Cl. 250—204 **6 Claims**



1. An apparatus for detecting vibration of an optical apparatus, including means for dividing rays of light reflected from an image towards said apparatus, means including a plurality of paired photosensors for producing output signals in response to said divided rays of light, and means for comparing the phases of said output signals for each pair of photosensors and determining the level of vibration of said optical apparatus according to changes in the relationship between said phases during a predetermined time period, means for establishing a predetermined permissible level of vibration and means for indicating when the level of vibration determined by said apparatus has exceeded said predetermined permissible level.

4,503,326

FIBER OPTIC OPTICAL DEVICE

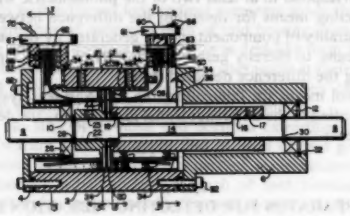
Robert F. Searle, Amherst, N.H., assignor to Vibrac Corporation, Amherst, N.H.

Division of Ser. No. 256,080, Apr. 21, 1981, Pat. No. 4,430,566. This application Aug. 31, 1983, Ser. No. 528,257
Int. Cl.³ G02B *5/14*
U.S. Cl. 250—227 **5 Claims**

1. An optical device comprising in combination:
(a) an inner housing in the form of an elongate member having at one end an outer cylindrical portion with a first diameter;
(b) an outer housing in the form of a hollow elongate member of similar length as said inner housing and dimensioned to fit about said inner housing in spaced-apart relationship, said outer housing having at one end an inner cylindrical portion defining a second diameter;
(c) means supporting said inner and outer housings conterminous with one another in confronting spaced-apart relationship, thereby defining an interior space, and with said outer and inner cylindrical portions substantially

concentric and coplanar with one another, thereby defining a first aperture of substantially annular form;

(d) means for defining a second aperture, remote from, and not coaxial with, said first aperture;



(e) means for transmitting light between substantially the entire expanse of said first aperture and said second aperture along a path, said means for transmitting and said path being wholly outside of said inner housing.

4,503,327

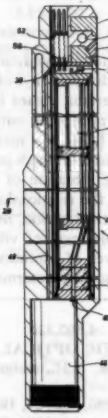
COMBINATION THERMAL AND RADIATION SHIELD

Billy F. Wilson, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jul. 6, 1982, Ser. No. 395,162

Int. Cl.³ G01V *5/04*; G12B *15/06*

U.S. Cl. 250—261 **13 Claims**



1. Apparatus for well logging including an elongated body member containing at least one component therein, and further including thermal protection and radiation shielding for said component, said thermal protection and radiation shielding comprising:

a volume of eutectic compound contained within said body member,

said eutectic compound having a predetermined eutectic temperature characteristic and a predetermined density,

said volume being sufficient to provide a duration of effective temperature stabilization for said component,

at least a portion of said eutectic compound distributed substantially around said component in effective proportions to selectively impede the impinging of said component by radiation.

4,503,328

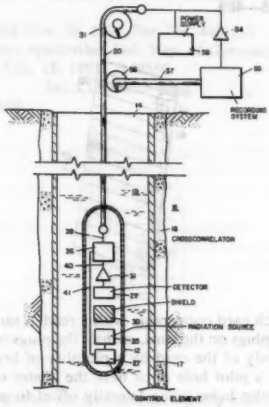
EVALUATION OF THE INTERACTION WITH RADIANT ENERGY OF SUBSTANCES TRAVERSED BY A BOREHOLE

Jacob Neufeld, Oak Ridge, Tenn., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 301,653, Sep. 14, 1981, Pat. No. 4,403,146, which is a division of Ser. No. 149,276, May 12, 1980, Pat. No. 4,326,129, which is a continuation-in-part of Ser. No. 904,591, May 10, 1978, abandoned. This application Jun. 1, 1983, Ser. No. 500,124

Int. Cl.³ G01V *5/00*

U.S. Cl. 250—262 **10 Claims**



1. A method of exploring a fluid filled well borehole traversing subterranean earth formations, comprising the steps of:

generating, in a fluid filled well borehole, a relatively short duration discrete burst of fast neutrons which are rapidly moderated by interaction with nuclei of materials in the borehole and surrounding earth formations and slowed down to thermal energy, creating a thermal neutron population in the borehole and surrounding earth formations, which thermal neutron population interacts with substances in the borehole and substances in the earth formations traversed by the borehole;

detecting, as a function of time, gamma radiations resulting from the interaction of said thermal neutron population with substances in the borehole and substances in the earth formations traversed by the borehole;

developing a response function characterizing said borehole and formation substances and having a generally decreasing portion as a function of time, wherein said decreasing portion can be expressed as a sum of borehole and formation component functions which are exponential functions decaying with time; and

decomposing said decreasing portion into said component functions and determining the rates of decay of said borehole and said formation substance components therefrom.

4,503,329

ION BEAM PROCESSING APPARATUS AND METHOD OF CORRECTING MASK DEFECTS

Hiroshi Yamaguchi, Fujisawa; Tateoki Miyauchi, Yokohama; Akira Shimase, Yokohama, and Mikio Hongo, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 29, 1982, Ser. No. 427,584

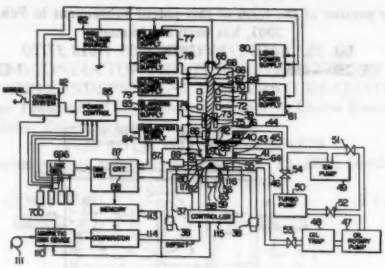
Claims priority, application Japan, Sep. 30, 1981, 56-153806

Int. Cl.³ G01N *23/00*

U.S. Cl. 250—309 **12 Claims**

1. An ion beam processing apparatus provided within a

vacuum container with a specimen chamber with a table for mounting a work piece or specimen provided therein comprising: a high density ion source confronting said specimen chamber, an extraction electrode for extracting an ion beam out of said ion source, a grid electrode for controlling energy and stability of the ion beam, a first aperture controlling the focused spot diameter and the spot current, at least a set of electrostatic lenses for focusing the ion beam which is outputted through said first aperture to form a spot, X-axis and Y-axis deflection electrodes which cause the beam spot to scan over the specimen, a secondary charged-particle detector which detects the intensity of secondary charged-particles emitted from the specimen as it is exposed to a low-power ion beam and transduces the intensity of emission into an electrical signal, a TV monitor which receives the output of said detector and deflection signals applied to said deflection electrodes and



performs the scanning of a spot having an intensity in proportion to the output of said secondary charged-particle detector in synchronization with the ion beam which scans the specimen so as to allow the observation of the surface of the specimen, setting means for setting the range of processing to said TV monitor, a second aperture for interrupting a projection of the ion beam to the specimen and provided between at least a portion of said set of electrostatic lenses and said deflection electrodes, a beam blanking electrode disposed above said second aperture, said beam blanking electrode being operated by a signal produced by said setting means in correspondence to the deflection signal for deflecting the ion beam out of said second aperture, and switching means for switching the power supplies for detecting a deflect on the specimen by said detector and for processing said defect on said specimen by sputtering.

4,503,330

DETERMINING LEVEL OR TILT ANGLE OF SOLIDS IN A ROTATABLE CHAMBER

Daniel P. Hearn, Richardson, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

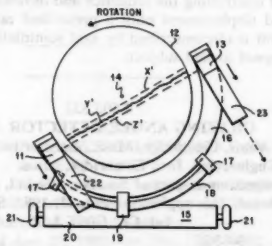
Filed Dec. 10, 1981, Ser. No. 329,499
Int. Cl.³ G01F *23/00*
U.S. Cl. 250—357.1 **5 Claims**

1. A method for determining the approximate location of he subsurface of a bed of particulate solids in an elongated rotatable chamber having a central longitudinal axis that is at an angle of more than 60° to vertical, at least a portion of said chamber having a round cross section, comprising:

(a) locating a collimated gamma ray radioactive source near a side of said round portion of said chamber at a first point and a count rate detector for gamma ray energy near a side of said round portion of said chamber in a manner such that a first straight line between said source and said detector is a transverse scan through said chamber, said first straight line between said collimated radioactive source and said detector being of determinable length, said transverse scan being at a first transverse point, passing gamma ray energy through said chamber, and measuring the count rate of said detector at said first transverse point;

(b) locating a collimated gamma ray radioactive source near a side of said round portion of said chamber at a second point different from said first point and a count rate detector for gamma ray energy near a side of said round portion of said chamber in a manner such that a second straight line between said source and said detector is a transverse scan through said chamber, said second straight line between said collimated source and said detector having a determinable second length, said second length being the same as said first length of said first straight line, said transverse scan being at a second transverse point, said second transverse point being spaced transversely from said first transverse point, passing gamma ray energy through said chamber and measuring the count rate of said detector at said second transverse point,

(c) locating a collimated gamma ray radioactive source near one side of said round portion of said chamber at a third



point different from said first and said second points and a count rate detector for gamma ray energy near a side of said round portion of said chamber in a manner such that a third straight line between said source and said detector is a transverse scan through said chamber, said third straight line between said collimated source and said detector having a determinable third length, said third length being the same as said first length of said first straight line, said transverse scan being at a third transverse point, said third transverse point being spaced transversely from said first transverse point and from second transverse point in approximately the same transverse plane as said first and said second transverse points, said third transverse point being transversely located between said first and said second transverse point, passing gamma ray energy through said chamber and measuring the count rate of said detector at said third transverse point, and

(d) correlating the transverse scans of steps (a), (b) and (c) to determine the approximate location of said surface of said bed of particulate solids in said chambers.

4,503,331

NON-CIRCULAR EMISSION COMPUTED TOMOGRAPHY

Richard M. Kovacs, Jr., Monroe, Conn.; Eugene J. Senger, Chagrin Falls, and Robert H. Wake, Solon, both of Ohio, assignors to Technicare Corporation, Solon, Ohio

Filed Apr. 21, 1982, Ser. No. 370,425
Int. Cl.³ G01T *1/20*
U.S. Cl. 250—363 S **12 Claims**

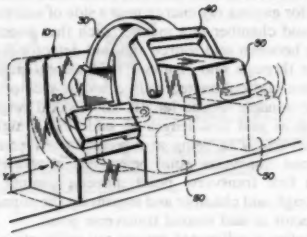
1. In a radiographic imaging device of the type having a circularly rotatable scintillation detector adapted for emission computed tomographic imaging of a subject by orbiting about the subject, the improvement comprising:

(a) means for rotating said scintillation detector predetermined angular increments about the subject along said circular orbit such that a portion of said detector is maintained within a plane defined by said orbit;

(b) means for displacing the subject relative to the center of

radius of said circular orbit during at least a portion of said orbit such that said orbit is maintained within said plane; and

(c) synchronous control means in communicating relationship with said rotating means and said displacing means for controlling the sequence and duration of said rotation and displacement until a prescribed non-circular planar orbit is circumscribed by said scintillation detector with respect to said subject.



4,503,332

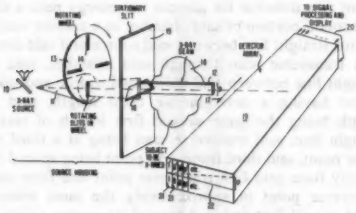
GRAZING ANGLE DETECTOR ARRAY

Martin Annis, Cambridge, Mass., assignor to American Science and Engineering, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 304,442, Sep. 21, 1981, abandoned. This application Jul. 21, 1982, Ser. No. 400,534

Int. Cl.³ G01T *1/20*

U.S. Cl. 250—366 **20 Claims**



1. A detector array for use with a radiant energy source that produces a beam of radiant energy which is swept in a predetermined linear scan direction through an object being examined, the cross section of said beam being substantially rectangular in configuration and having its longer cross-sectional dimension oriented transverse to said linear scan direction, said array being positioned to intercept radiant energy which has passed from said source through said object, said array comprising a plurality of elongated tubular members disposed in juxtaposed parallel relation to one another with the axis of elongation of each of said tubular members being oriented substantially parallel to said linear scan direction, each of said tubular members being fabricated of a radiant energy transparent material and having an interior surface which is reflective to optical photons, each of said tubular members including a sheet of scintillator material which has an elongated rectangular planar surface extending in the direction of elongation of said tubular member and positioned to intercept radiant energy passing through said tubular member as said beam is swept in said linear scan direction, the length of each of said planar surfaces being at least equal to the linear extent of said beam scan, the width of each of said planar surfaces being a fraction of the longer cross-sectional dimension of said beam whereby each of said surfaces intercepts only a portion of said beam as said beam is swept in said scan direction, the planar surface of each of said sheets of scintillator material being oriented to intercept said portion of said beam at a grazing angle, different ones of said planar surfaces intercepting different portions of said beam, and a plurality of light responsive elements coupled to said plurality of tubular members respectively for receiving optical photons that are emitted by said bodies of scintillator material.

4,503,333

ANTIMICROBIAL ULTRAVIOLET IRRADIATION OF CONNECTOR FOR CONTINUOUS AMBULATORY PERITONEAL DIALYSIS

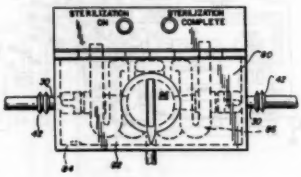
Ralph Kulin, Marengo, Ill.; Jack W. Moncrief; Robert P. Popovich, both of Austin, Tex., and Ronald C. Stauber, Hawthorne Woods, Ill., assignors to Baxter Travenol Laboratories, Deerfield, Ill.

Division of Ser. No. 270,743, Jun. 5, 1981,. This application Feb. 24, 1983, Ser. No. 469,196

The portion of the term of this patent subsequent to Feb. 21, 2001, has been disclaimed.

Int. Cl.³ A61L *2/10;* **G21K** *5/08;* **H01J** *37/20*

U.S. Cl. 250—455.1 **7 Claims**



1. An ultraviolet light applicator for irradiating a connector valve and adjacent connected conduits, for selectively permitting the transfer of fluids therethrough, said applicator comprising a casing, means permitting placement of said connector valve into said casing, the inner surfaces of said casing being of an ultraviolet-reflecting material, and an elongated ultraviolet light element in said casing defining a plurality of convolutions plus a channel between said convolutions of the element for receiving the connector valve, said convolutions being positioned on at least three sides of said channel and said convolutions extending substantially along said channel, said convolutions being capable of irradiating by ultraviolet light the transversely-disposed interior surfaces of said connector valve and connected conduits.

4,503,334

METHOD OF USING AN ELECTRON BEAM

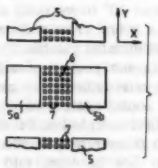
Hewson N. G. King, Redhill, and James P. Beasley, Tadworth, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 18, 1982, Ser. No. 435,021

Claims priority, application United Kingdom, Nov. 2, 1981, 8132927

Int. Cl.³ G01N *21/00, 23/00*

U.S. Cl. 250—491.1 **21 Claims**



1. In a method of using an electron beam to sequentially

carry out a process at least at two adjacent surface areas of a target having at least one reference marker provided between said two adjacent surface areas, said method comprising the steps of

carrying out said process at one of said two adjacent surface areas,

thereafter directing an electron beam having the same size and shape as said reference marker toward a predetermined position of said reference marker,

detecting back-scattered electrons from the area of said reference marker by a detection device, said detection device providing signals representative of deviations between the actual position and said predetermined position of said reference marker, and

compensating for any said deviations before carrying out said process at another of said two adjacent surface areas.

4,503,335

SEMICONDUCTOR PRINTING APPARATUS WITH MULTIPLE INDEPENDENT TEMPERATURE CONTROL

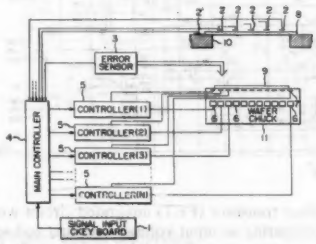
Kazuo Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 6, 1982, Ser. No. 366,070

Claims priority, application Japan, Apr. 13, 1981, 56-55199

Int. Cl.³ G01N *21/86*

U.S. Cl. 250—548 **9 Claims**



1. A semiconductor printing apparatus capable of compensating for any relative local variation in size between a mask and a wafer in the planes of the mask and the wafer, said printing apparatus comprising:

means for holding a mask;

means for holding a wafer; and

means for locally adjusting the temperature of at least one of the mask and the wafer thereby compensating for the local variation in size in the planes of the mask and the wafer between the mask and wafer.

4,503,336

BEAM FORMER HAVING VARIABLE DELAYS BETWEEN LED OUTPUT SIGNALS

Richard A. Hutchin, Marlboro, and William C. Bradley, Sudbury, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed Jun. 14, 1982, Ser. No. 388,010

Int. Cl.³ H01J *40/14*

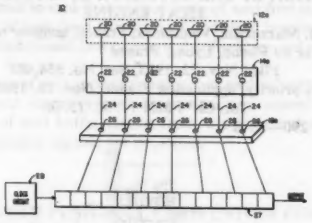
U.S. Cl. 250—578 **18 Claims**

1. A beamformer device for forming at least one beam from the outputs of a sensor array, comprising:

a plurality of radiation sources;

means for providing to each said radiation source a sensor signal from an associated one of the sensors in said sensor array;

a detector array of radiation-sensitive means for providing a series of spaced signals, each spaced signal representing radiation incident from a particular one of said radiation sources; and



means for varying the delays between said spaced signals for optimizing the response of said device to a signal from a predetermined direction.

4,503,337

POWER SUPPLY SYSTEM FOR HEAT AND ELECTRICITY

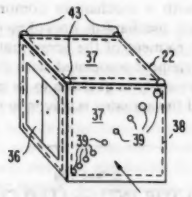
Günther Häfner; Hermann Lenz, and Helmut Finger, all of Stuttgart, Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 27, 1982, Ser. No. 372,130

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1981, 3116624

Int. Cl.³ F01B *21/00*; F01K *17/02*; F02C *6/02, 6/04*

U.S. Cl. 290—4 D **29 Claims**



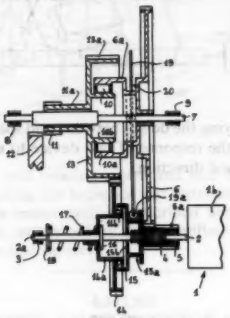
1. A power supply system including at least one first statically and functionally independent unit for generating at least one of heat and electricity, a first unit of said at least one independent unit including an internal combustion engine for generating mechanical energy and waste heat, electric generator means driven by the internal combustion engine, frame means for supporting the at least one first unit, and supply and removal line means arranged on one side of the frame means, characterized in that at least one second statically and functionally independent unit is provided for generating at least one of heat and electricity, said at least one second unit includes supply and return line means disposed on one side thereof and adapted to be accommodated in the frame means with the supply and return line means thereof disposed on the same side of the frame means as the supply and return line means of the at least one first unit, each of the supply and return line means of each of the units terminating in a connection means for enabling a connection between the units, the connection means of each of the units including a plurality of connections which are disposed diagonally across a grid pattern on one side of the respective units, and in that the grid pattern is the same for all of the units.

4,503,338

SYSTEM FOR CONTROLLING THE ADVANCE AND ROTATION OF THE ACTUATOR OF A STARTER FOR HEAT ENGINE

Alfred B. Mazzorana, Venissieux, France, assignor to Societe de Paris et du Rhone, Lyons, France

Filed Nov. 22, 1983, Ser. No. 554,485
Claims priority, application France, Nov. 26, 1982, 82 20104
Int. Cl.³ F02N 11/00, 15/06
U.S. Cl. 290—38 R 13 Claims



1. A system for controlling the actuator of a starter incorporating a reduction gear for heat engine,

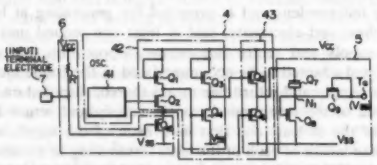
wherein it comprises a screw-nut assembly of which one of the elements is associated with the shaft of the motor for its rotation to provoke advance, against a return spring, of the other element which communicates this movement to the actuator pinion up to a stop blocking its displacement, wherein the movement of the actuator pinion is effected via a driver whose output rotates the pinion of the actuator through a free wheel, said output of the driver being associated with a mechanism comprising a centrifugal clutch, which mechanism provokes relative rotation of the relevant element of the screw-nut assembly with respect to its element associated with the shaft in order to return the assembly in question to its initial position when the pinion of the actuator is driven in rotation by the heat engine.

4,503,339

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING A SUBSTRATE VOLTAGE GENERATING CIRCUIT

Norihisa Tsuge, Kamakura; Tomio Nakano, and Masao Nakano, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed May 5, 1982, Ser. No. 375,308
Claims priority, application Japan, May 12, 1981, 56-71045
Int. Cl.³ H03K 17/16, 17/687
U.S. Cl. 307—296 R 9 Claims



1. A semiconductor device, operatively connected to receive an external signal, having a semiconductor substrate, comprising:

a substrate voltage-generating circuit comprising:

an oscillating circuit, operatively connected to said substrate voltage generating circuit, for generating an output signal;

a pumping circuit, operatively connected to said oscillating circuit, operating in response to said output signal of said oscillating circuit and applying a predetermined substrate bias voltage to the semiconductor substrate;

a terminal electrode for receiving the external signal; and

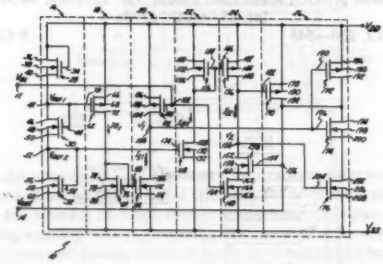
a control circuit, operatively connected between said terminal electrode and said oscillating circuit, for stopping the application of said output signal from said oscillating circuit to said pumping circuit upon receipt of the external signal, said pumping circuit stopping the application of said predetermined substrate bias voltage to the semiconductor substrate.

4,503,340

CMOS WINDOW DETECTOR WITH HYSTERESIS

William J. Linder, Plymouth, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 16, 1982, Ser. No. 418,512
Int. Cl.³ H03K 5/153
U.S. Cl. 307—360 49 Claims



1. A field effect transistor (FET) integrated circuit window detector for comparing an input voltage with first and second voltage levels representing a desired voltage window, the circuit comprising:

input means for receiving the input voltage;

first and second supply means adapted to receive first and second supply voltage levels, respectively;

bias circuit means for establishing bias current flow between the first and second supply means;

first current mirror FET means having a channel, a gate, a source, and a drain, the first current mirror FET means being connected to the bias circuit means so that a first current flow through the source-drain current path of the first current mirror FET means is established as a function of bias current flow;

first current control FET means having a channel, a gate, a source and a drain, the source and drain of the first current control FET means being connected in a first series current path with the source and drain of the first current mirror FET means between the first and second supply means, and the gate of the first current control FET means being connected to the input means to receive the input voltage; so that when the input voltage attains a first voltage level, current flow through the source-drain current path of the first current control FET means changes;

second current mirror FET means having a channel, a gate, a source, and a drain, the second current mirror FET means being connected to the bias circuit means so that a second current flow through the source-drain current path of the second current mirror FET means is established as a function of bias current flow;

second current control FET means having a channel, a gate, a source and a drain, the source and drain of the second

current control FET means being connected in a second series current path with the source and drain of the second current mirror FET means between the first and second supply means, and the gate of the second current control FET means being connected to the input means to receive the input voltage, so that when the input voltage attains a second voltage level current flow through the source-drain current path of the second current control FET means changes; and

output means connected to the first and second current paths for providing a digital output signal exhibiting hysteresis with respect to the input voltage, the digital output signal switching from a first state to a second state if the digital output signal was previously in the first state and the input voltage increases to a value greater than the first voltage level, and switching from the second state to the first state if the digital output signal was previously in the second state and the input voltage decreases to a value less than the second voltage level.

4,503,341

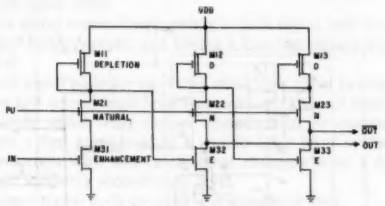
POWER-DOWN INVERTER CIRCUIT

Ashwin H. Shah, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 31, 1983, Ser. No. 528,319

Int. Cl.³ H03K *19/003, 19/094*

U.S. Cl. 307—450 **6 Claims**



1. A buffer circuit comprising:

a power-up terminal for providing a power-up signal;

an input terminal for providing an input signal;

a power supply providing a first supply voltage;

means providing a second supply voltage;

first, second, and third inverters, each inverter comprising:

first, second and third field effect transistors connected in series,

said first transistor being a depletion mode transistor having a source, a drain, and a gate, the drain of said first transistor being connected to said power supply, and the source of said first transistor being connected to the gate,

said second transistor being a power-down transistor having a source, a drain, and a gate, the drain of said second transistor being connected to the gate and the source of said first transistor, and

said third transistor being an enhancement mode transistor having a source, a drain, and a gate, the drain of said third transistor being connected to the source of said second transistor, and the source of said third transistor being connected to said second supply voltage-providing means;

the gate of said third transistor of said first inverter being connected to said input terminal for receiving an input signal therefrom;

the gates of said second transistors of said first, second and third inverters being connected to said power-up terminal for receiving a power-up signal;

said source of said first transistor of each of said first and second inverters providing respective first output nodes of said buffer circuit associated with said first and second inverters;

said gate of said third transistor of said second inverter being connected to said first output node of said first inverter;

said gate of said third transistor of said third inverter being connected to said first output node of said second inverter; and

said source of said second transistor of each of said second and third inverters providing respective second output nodes of said buffer circuit from which complementary buffer output signals are provided.

4,503,342

LOW POWER PUSH-PULL CMOS DRIVER CIRCUIT

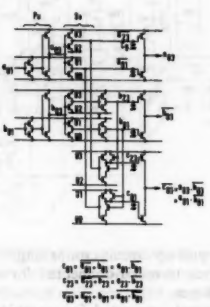
Fritz G. Adam, Freiburg, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 23, 1982, Ser. No. 444,013

Claims priority, application European Pat. Off., Dec. 17, 1981, 81110521

Int. Cl.³ H03K *19/094, 19/20, 17/30*

U.S. Cl. 307—475 **2 Claims**



1. An integrated CMOS circuit, comprising: a power stage in the form of a source-drain drain-source series circuit of two complementary channel type insulated-gate field-effect transistors which are each arranged in a substrate region with the source regions of the field-effect transistors to each of which is applied one of two supply potentials, an output signal being taken from the node connecting the two drain regions of said field-effect transistors, and gate electrodes for simultaneously receiving two driver signals; a driver stage for splitting up a digital input signal into two driver signals of the same phase, which simultaneously appear at respective ones of two outputs, said gate electrode of said field-effect transistor supplied with one of the supply voltages connected to the first output of the driver stage, said gate electrode of said field-effect transistor supplied with the other of said supply voltages connected to the second output of said driver stage, whereby the driver signals raise the source-gate voltage of one of said two field-effect transistors above its threshold voltage value,

wherein said driver stage comprises two CMOS inverters each with a pair of complementary insulated-gate field-effect transistors, to the gate electrodes of which the digital input signal is applied, that the first output of said driver stage is connected to the output of the first CMOS inverter whose first transistor is connected at its source electrode to the one supply voltage and whose second transistor is connected at its source electrode to an intermediate supply voltage, that the second output of said driver stage is connected to the output of the second CMOS inverter whose second transistor is connected with its source electrode to the other supply voltage and whose first transistor is connected at its source electrode to another intermediate supply voltage, and to said two CMOS inverters there is applied one supply voltage which is

higher than the threshold voltage of the respective insulated-gate field-effect transistors of the CMOS power stage circuit which are to be controlled,

a further driver stage for receiving a further digital input signal and a logic element, one driver signal of said driver stage together with a driver signal of the further driver stage being applied to an input of the logic element, with an output of the logic element being connected to one gate electrode of the complementary insulated-gate field-effect transistors of said power stage.

4,503,343

ACTIVE PULL-UP CIRCUIT

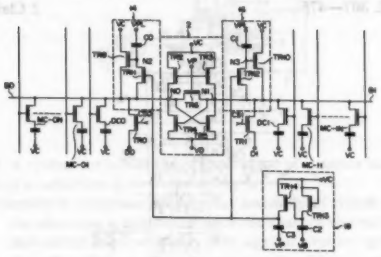
Kazunori Ohuchi, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Sep. 24, 1982, Ser. No. 423,295

Claims priority, application Japan, Jan. 14, 1982, 57-4732

Int. Cl.³ G11C *7/00*; H03K *5/05, 17/693*

U.S. Cl. 307—482 **3 Claims**



1. An active pull-up circuit comprising:

a power source terminal connected for receiving a power source voltage;

an input terminal connected for receiving a pull-up signal which is generated after a precharge period;

capacitive means having a first end connected to said input terminal;

a first MOS transistor having a current path connected between a second end of said capacitive means and a signal line;

a second MOS transistor having a current path connected between said power source terminal and signal line and having a gate connected to a junction between said capacitive means and first MOS transistor, said signal line being precharged through said second MOS transistor to a power source voltage level during said precharge period; and

control means for supplying a first output voltage to a gate of said first MOS transistor in response to a precharge signal which is generated during said precharge period, said first output voltage being kept higher than the sum of the power source voltage and a threshold voltage of said first MOS transistor, and supplying a second output voltage to the gate of said MOS transistor in response to a control signal which is generated after the lapse of said precharge period, said second output voltage being kept substantially equal to the power source voltage.

4,503,344

POWER UP RESET PULSE GENERATOR

Bruce A. Brillhart, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 9, 1982, Ser. No. 366,906

Int. Cl.³ H03K *5/153, 17/16, 17/20, 17/687*

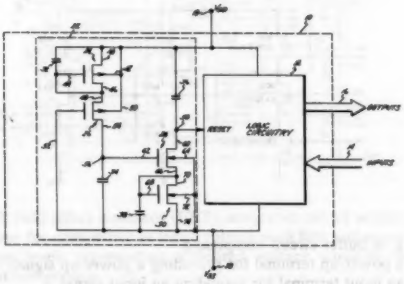
U.S. Cl. 307—594 **13 Claims**

1. A power up reset pulse generator for producing a reset pulse at an output in response to voltage being applied between first and second power supply terminals of an integrated circuit of a magnitude greater than a first threshold value after the applied voltage being less than this value, where the first and second power supply terminals are for connection to first and second voltage supplies, the power up reset pulse generator comprising:

first capacitor means;

first series FET means for controlling charging of the first capacitor means at a function of the voltage between the first and second power supply terminals, the first series FET means being connected in series with the first capacitor means in a first series charging path between the first and second power supply terminals, with the first series FET means comprising:

a first delay capacitor means, and a plurality of FET devices, including a control FET and a first threshold addition FET each having a source, a drain, and a gate, such that the first threshold addition FET source is electrically connected to the first power supply terminal with the first threshold addition FET gate and drain electrically connected together to place the first threshold addition FET in the first series charging path, with the first delay capacitor means electrically connected between the first power supply terminal and the first threshold addition FET gate, and with the control FET source and drain electrically connected to place the control FET in the first series charging path leaving the control FET gate responsive to the voltage between the first and second power supply terminals to permit charging of the first capacitor means to establish a voltage across the first capacitor means when the voltage between the first and second power supply terminals exceeds a first predetermined level;



second capacitor means connected between the first power supply terminal and the output; and

second FET series means for controlling charging of the second capacitor means as a function of the voltage across the first capacitor means, the second FET series means being connected in series with the second capacitor means in a second series charging path between the first and second power supply terminals, and the second FET series means being responsive to the voltage across the first capacitor means to permit charging of the second capacitor means when the voltage across the first capacitor means exceeds a second predetermined level, whereby if voltage is applied between the first and second power supply terminal greater than the threshold value, the voltage at the output with respect to the second power supply terminal follows the first power supply terminal voltage until increasing voltage across the first capacitor means reaches the second predetermined level which causes the second FET means to permit charging of the second capacitor means such that the voltage at the output approaches the second power supply terminal voltage.

4,503,345

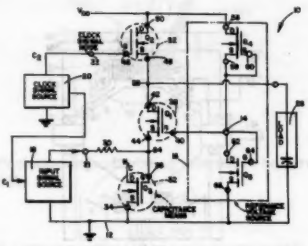
MOS/LSI TIME DELAY CIRCUIT

Michael M. Yamamura, Cupertino, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 2, 1982, Ser. No. 394,741

Int. Cl.³ H03K *17/284, 17/693, 19/094*

U.S. Cl. 307—605 **16 Claims**



1. A time delay circuit for operation between a voltage source and a reference potential, such as ground, and having

voltage reference node for receiving a reference voltage from a reference voltage source,

an input signal source for providing an input signal at an input signal node,

a clock signal source for providing a clock signal, said clock signal being periodic and having a first and second logic level,

a clock signal node for receiving said clock signal having a first and second logic level from said clock signal source,

said input signal being further characterized by changing from a first logic level to a second logic level at times concurrent with said clock signal changing from a first logic level to a second logic level,

an output signal node coupled to a capacitive load,

said time delay circuit comprising:

a resistor,

a capacitance means having a first and second node, said first node being connected to said reference potential, said resistor being connected between said input signal node and said capacitance means second node,

a first multiterminal semiconductor device having a control electrode and a conduction channel having a first and second terminal, said first multiterminal semiconductor device control electrode being connected to said voltage reference node, said first multiterminal semiconductor device conduction channel second terminal being connected to said capacitance means second node, said first multiterminal semiconductor device conduction channel first terminal being connected to said output signal node,

a second multiterminal semiconductor device having a control electrode and a conduction channel having a first and second terminal, said second multiterminal semiconductor device control electrode being connected to said clock signal node, said second multiterminal semiconductor device conduction channel first terminal being connected to said output signal node, and said second multiterminal semiconductor device conduction channel second terminal being connected to said voltage source;

whereby, said time delay circuit being responsive to said clock signal first logic level precharges said output signal node voltage on said capacitive load to a corresponding first logic level voltage and at a time subsequent to said precharge interval, said time delay circuit, in response to a clocked input signal, discharges said output signal node voltage after a predetermined delay interval measured from said input signal changing from a first logic level to a second logic level.

4,503,346

ELECTRIC MOTOR HAVING A STATOR IRON OF A BENT SHAPE

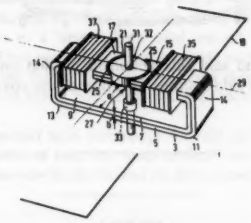
Leo Bertram, Stolberg, Fed. Rep. of Germany, and Hugo Schemmann, Schaesberg, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 16, 1984, Ser. No. 571,285

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1983, 3301265

Int. Cl.³ H02K *37/00*

U.S. Cl. 310—49 R **22 Claims**



1. An electric motor having a bent stator iron, pole shoe shanks formed from the stator iron which at their free ends form pole shoes, induction coils provided on the shanks and a radially magnetized, permanent magnetic rotor provided between the pole shoes having a rotor shaft, the pole shoes formed at the free ends of the pole shoe shanks oppositely disposed, and the rotor shaft intersecting the central longitudinal line of the two pole shoe shanks, which pole shoe shanks have parts facing away from the pole shoes which parts are bent and are interconnected in the form of a bridge.

4,503,347

THERMALLY PROTECTED DYNAMOELECTRIC MACHINE AND METHOD OF ASSEMBLY

Ernest R. Bergman, Rossburg, Ohio, assignor to Copeland Corporation, Sidney, Ohio

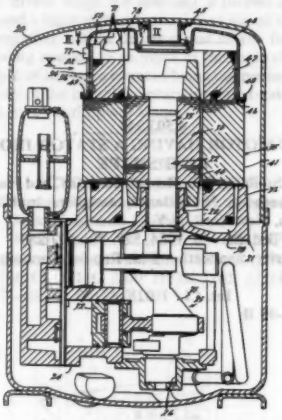
Continuation of Ser. No. 70,325, Aug. 27, 1979, abandoned. This application Mar. 22, 1982, Ser. No. 360,200

Int. Cl.³ H02K *11/00*

U.S. Cl. 310—68 C **13 Claims**

1. In a dynamoelectric machine having a rotor, and having a stator assembly including a field iron portion and a field winding portion at one end of the stator assembly, a generally belled cover overlying said field winding portion and secured to the field iron portion at said end of the stator assembly, the novelty which comprises a protector assembly including a holder and a thermally responsive protector retained by said holder, end and side abutment portions on the holder spaced from the protector and engageable by two different portions of the cover of the machine to maintain said protector in close proximity to the winding portion and block movement of the

holder and protector away from the winding, said end abutment portion on the holder being engageable by an end portion



of the cover and said side abutment portion on the holder engageable by a side abutment portion of the cover.

4,503,348

MAGNETIC TRANSDUCER

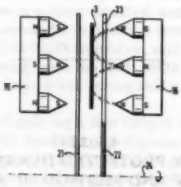
Friedrich J. Esper, Leonberg, and Gottfried Meudt, Asperg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 27, 1979, Ser. No. 97,843

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1978, 2851365

Int. Cl.³ H02K *21/38*

U.S. Cl. 310—155 **2 Claims**



1. A transducer, for production of electrical signals (11,12; 13,14), having magnetic systems (4; 15,16; 30,31) for magnetization and re-magnetization of a Wiegand sensor wire (3), said wire (3) having a sensor coil (5,6) wound thereon, wherein said wire (3) has been originally magnetized in one direction by a strong magnetic field (H_p), and has a magnetization direction operationally controllable by means of a weak alternating magnetic field (H_s),

said magnetic systems comprising

a first magnetic system (15,30) and a second magnetic system (16,31) disposed on either side of said sensor wire (3) such that magnetic poles of opposing sign face one another,

and further comprising

shield means for alternate shielding of said sensor wire (3) from said first and second magnetic systems (15,16; 30,31) respectively.

4,503,349

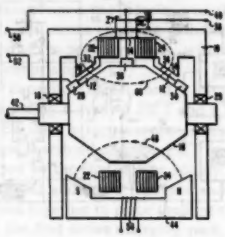
SELF-EXCITED HIGH CURRENT DC ELECTRICAL PULSE GENERATOR

Henry W. Miller, Saratoga, Calif., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 29, 1983, Ser. No. 518,337

Int. Cl.³ H02K *31/00*

U.S. Cl. 310—178 **15 Claims**



1. A high current DC electrical pulse generator comprising:

a stator member;

a rotor concentrically positioned within said stator and mounted for relative rotation therewith;

a main stator winding including two winding sections each being helically wound around said rotor and each being coaxial with said rotor, wherein adjacent ends of said winding sections are electrically connected to a common connection point;

a pair of brushes disposed in sliding contact with said rotor, mounted on opposite side of said main stator winding in an axial direction, and electrically connected to opposite ends of said main stator winding;

a third brush disposed in sliding contact with said rotor and mounted at an intermediate position on said rotor between said first pair of brushes;

means for connecting an external load between said third brush and said common connection point between said winding section such that said load is connected across two branch circuits, each comprising the series connection of one of said winding sections and a portion of said rotor extending between one of said pair of brushes and said third brush; and

means for rotating said rotor.

4,503,350

PIEZOELECTRIC RESONATOR DEVICE WITH A LAMINATED STRUCTURE

Hiroshi Nakatani, Kanazawa, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

Filed Jan. 4, 1984, Ser. No. 568,508

Claims priority, application Japan, Jan. 18, 1983, 58-7161

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—321 **11 Claims**

1. A piezoelectric resonator device with a laminated structure comprising:

at least first and second piezoelectric plates, each having opposite flat surfaces and polarized in a predetermined direction;

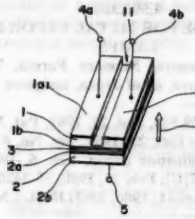
first and second electrode means deposited on said opposite flat surfaces, respectively, of said first piezoelectric plate;

third and fourth electrode means deposited on said opposite flat surfaces, respectively, of said second piezoelectric plate;

a junction layer rigidly held between second and third electrodes for assembling said first and second piezoelectric plates together in a laminated structure; and

connecting means for electrically connecting said second and third electrodes,

a weight ratio of said junction layer to a sum of first and second piezoelectric plates and first, second, third and



fourth electrode means being selected to be between 0.5% and 5%.

4,503,351

PIEZOELECTRIC ELEMENT FOR INCORPORATION IN PRESSURE, FORCE OR ACCELERATION TRANSDUCERS

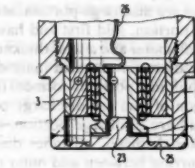
Conrad Sonderegger; Hans C. Sonderegger, both of Neftenbach, and Werner Boltshauser, Winterthur, all of Switzerland, assignors to Kistler Instrumente A.G., Winterthur, Switzerland

Filed Oct. 17, 1979, Ser. No. 85,544

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1979, 2906407

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—329 **17 Claims**



1. A piezoelectric element for incorporation in pressure, force or acceleration transducers comprising at least two piezoelectric flat plates loaded in shear mode and arranged on both sides of a central support means, the at least two piezoelectric flat plates being retained under compressive pre-tension by pressure distribution members bearing externally on the piezoelectric plates, and a substantially stiff spring-like compression means for applying forces to the subassembly consisting of the support means, piezoelectric plates and pressure distribution members, the compression means including a compression form member having a non-circular slot disposed therein for receiving and retaining therein the subassembly, the compression form member being tightly fitted over the pressure distribution members.

4,503,352

GROOVED PIEZOELECTRIC CERAMIC RESONATOR WITH TWO POLING DIRECTIONS

Jiro Inoue, Kanazawa, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Dec. 15, 1983, Ser. No. 561,566

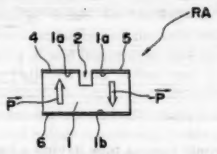
Claims priority, application Japan, Dec. 24, 1982, 57-228138

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—359 **6 Claims**

1. A piezoelectric ceramic resonator for vibrating in a length vibration mode, comprising:

a rectangular piezoelectric ceramic plate having first and second axially opposite ends and an approximately constant width between said first and second ends; said plate having first and second opposite main surfaces and a thickness therebetween; said plate further having a groove defined in said first main surface, said first main surface having first and second parts on opposite sides of said groove, said groove extending axially between said first and second ends for separating said first and second parts; said plate including a first portion between said first part of said first main surface and said second main surface, a second portion between said second part of said first main surface and said second main surface and a third portion between said first and second portions and between said



groove and said second main surface; said first portion being polarized in a first direction along said thickness of said plate to a first degree; said second portion being polarized in a second direction opposite said first direction to a second degree less than said first degree; said third portion not being polarized in any predetermined direction;

first and second split electrodes formed on said first and second parts of said first main surface; and

an entire face electrode formed on said second main surface.

4,503,353

CUT ANGLES FOR TUNING FORK TYPE QUARTZ RESONATORS

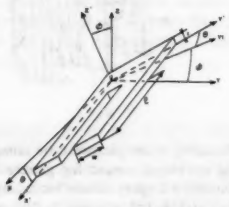
Jean Hermann, Neuchatel, Switzerland, assignor to Centre Electronique Horloger S.A., Neuchatel, Switzerland

Filed Jul. 11, 1983, Ser. No. 512,526

Claims priority, application Switzerland, Jul. 14, 1982, 4277/82

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—361 **14 Claims**



1. A piezoelectric resonator of the tuning fork type having two tines, said resonator comprising a quartz crystal plate having axes X', Y' and Z' and angles of cut ϕ and θ such that the axes X', Y' and Z' are established from the electrical axis X, the mechanical axis Y and the optical axis Z of the quartz crystal by means of first rotation through an angle ϕ about the axis Y, and a second rotation through an angle θ about the axis Z', said resonator vibrating in accordance with the fundamental torsional mode, the angles of cut ϕ and θ being selected so that the first-order temperature coefficient is substantially zero, the tines of the tuning fork being parallel to the axis X' of the quartz plate and the angles of cut ϕ and θ being such that:

$$50° < \phi < 70° \text{ and } 40° < \theta < 65°.$$

4,503,354

CAMERA TUBES

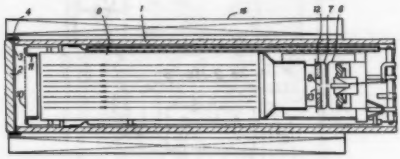
Eric D. Hendry, Chelmsford, England, assignor to English Electric Valve Company Limited, Chelmsford, England

Filed Nov. 27, 1981, Ser. No. 325,187

Claims priority, application United Kingdom, Nov. 27, 1980, 8038070

Int. Cl.³ H01J *31/38*

U.S. Cl. 313—382 **5 Claims**



5. An electronic camera tube having a longitudinal axis and comprising: a target; an electron gun having an output for projecting an electron beam towards said target for producing a beam spot on said target; a solenoid for producing a magnetic focusing field, said target and said gun disposed for operation within said field; a grid structure disposed at the output of said gun and containing a beam width defining aperture, said aperture having a sectional plane perpendicular to the longitudinal axis of the tube; and magnetic means adjacent the aperture for reducing the magnitude of said magnetic focusing field in the sectional plane of the aperture.

4,503,355

MASK-FOCUSING COLOR PICTURE TUBE

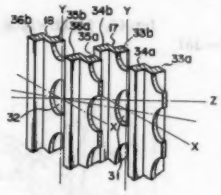
Eiji Kamohara, Fukaya, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 25, 1982, Ser. No. 392,244

Claims priority, application Japan, Jun. 26, 1981, 56-98200

Int. Cl.³ H01J *29/07*

U.S. Cl. 313—402 **17 Claims**



1. A mask-focusing color picture tube comprising:

an evacuated envelope; means for generating a number of electron beams; a display screen including a large number of phosphor stripes luminescing in different colors; and a plurality of shadow masks spaced a predetermined distance from each other, each of said plurality of shadow masks defining a number of apertures arranged in rows and disposed in the vicinity of said screen, each electron beam being assigned to one of said large number of phosphor stripes of a respective color through a corresponding one of said number of apertures, wherein at least one of said plurality of shadow masks includes a plurality of projections on at least one surface of said one shadow mask, said projections being separated from each other by the rows of said number of apertures defined by said one shadow mask, the projections at the central part of said one mask being located at symmetrical positions with respect ot the centers of said apertures defined by said one mask, at least part of the projections at the peripheral part of said one mask being located at asymmetrical positions with respect to the centers of said number of apertures defined by said one mask.

4,503,356

CERAMIC ARC TUBE FOR METAL VAPOR DISCHARGE LAMPS

Kazuo Kobayashi, Nagoya; Mamoru Furuta, Toyoake, and Yoshio Maeno, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

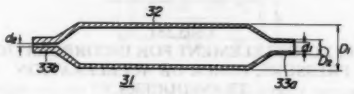
Division of Ser. No. 229,503, Jan. 29, 1981, Pat. No. 4,387,067.

This application Oct. 25, 1982, Ser. No. 436,372

Claims priority, application Japan, Feb. 6, 1980, 55-12377; Feb. 28, 1980, 55-24207[U]; Feb. 28, 1980, 55-24208[U]; Mar. 4, 1980, 55-27790[U]; Mar. 11, 1980, 55-31354[U]; Mar. 27, 1980, 55-41230[U]

Int. Cl.³ H01J *61/33*

U.S. Cl. 313—634 **6 Claims**



1. A ceramic arc tube for a metal vapor discharge lamp comprising:

an arc discharge portion having an outer diameter and an inner diameter;

a wall thickness between said outer diameter and said inner diameter;

a first electrode-holding portion, formed from an integral continuation of said arc discharge portion, at a first end of said arc discharge portion, said first end having an outer diameter, an inner diameter and a wall thickness occurring between said outer diameter and said inner diameter;

a second electrode-holding portion, formed from another integral continuation of said arc discharge portion, at an opposite end of said arc discharge portion, said opposite end having an outer diameter, an inner diameter and a wall thickness occurring between said outer diameter and said inner diameter;

the wall thickness of said first end and said opposite end is between 1.5 and 5.0 times the thickness of the wall of said arc discharge portion; said ceramic arc tube being produced by a method comprising the steps of:

forming a tubular green body by a mixture material containing fine alumina particles and plasticizer whose main ingredient is a non-thermal plastic organic substance;

shaping said tubular green body in a fusiform cavity of a die by applying fluid pressure to an inside diameter of said tubular green body, to inflate said arc discharge portion of the tubular green body more than said first end portion and said opposite end portion thereof; and

firing the thus shaped green body after removal thereof from said die.

4,503,357

CATHODE-RAY TUBE

Koukichi Ouhata, and Hiroyuki Sugawara, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 23, 1982, Ser. No. 452,447

Claims priority, application Japan, Feb. 24, 1982, 57-27358

Int. Cl.³ H01J *23/34*

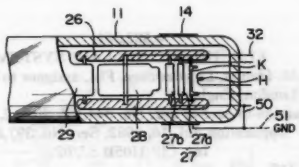
U.S. Cl. 315—1 **7 Claims**

1. A cathode-ray tube comprising:

a hermetically sealed, evacuated envelope having an electrically insulative neck section;

an electron-gun mount assembly incorporated into said neck section and including a cathode electrode means for emitting an electron beam, first grid electrode means for forming a crossover point and for accelerating the electron

beam, and second grid electrode means for focusing the electron beam, said cathode electrode means, said first grid electrode means and said second grid electrode means being arranged in this order along the tube axis and being mounted on a supporting means having a plurality of electrically insulative supporting bars disposed around said electron-gun mount assembly;



a conductive member which at least partially covers in a contacting fashion at least one of an outer surface portion of said neck section, an inner surface portion of said neck section and an outer surface portion of said supporting means which surround a portion of said electron-gun mount assembly including said first grid electrode means but excepting said second grid electrode means; and

a means for applying a predetermined potential to said conductive member during a normal operation of the tube.

4,503,358

FLUORESCENT LAMP HAVING SEPARATE COOLING MEANS FOR BALLAST AND FLUORESCENT TUBE

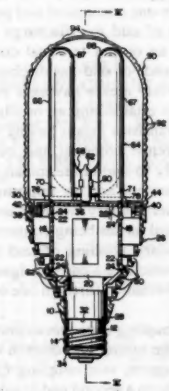
Taketo Kamei, and Kimio Osada, both of Yokosuka, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 1, 1982, Ser. No. 384,053

Claims priority, application Japan, Jun. 5, 1981, 56-86479

Int. Cl.³ H01J *17/28, 17/34, 61/52*

U.S. Cl. 315—58 **7 Claims**



1. A fluorescent lamp device, comprising:

a ballast;

a fluorescent tube which is electrically connected to said ballast and curved at least at one portion thereof to have a predetermined configuration;

a connector which is electrically connected to said ballast and detachably connected to an external socket to receive electric power;

envelope means defining an inner space for housing said ballast and said fluorescent tube therein to hold said connector in such a manner as to project externally from the envelope means and allow light emitted from said fluorescent tube to be transmitted therethrough;

insulation means, provided in said envelope means, for establishing first and second spaces in said inner space of said envelope means, said first and second spaces having said ballast and said fluorescent tube respectively positioned therein, and for thermally insulating said ballast and said fluorescent tube relative to one another;

first heat discharge means for causing said fluorescent tube to contact at least partially and directly with ambient air outside said envelope means independently of said ballast and for promoting heat exchange between said fluorescent tube and the ambient air; and

second heat discharge means for causing said ballast to be contacted at least partially and directly with the outside air independently of said fluorescent tube so as to promote heat exchange between said ballast and the outside air; wherein

said envelope means includes a bowl-shaped member which stably houses said ballast therein and holds said connector so as to project outside therefrom, said bowl-shaped member having an open end, and said insulation means includes a plate member made of thermally insulating material and attached to the open end of said bowl-shaped member; wherein

said bowl-shaped member has a side provided with at least one hole at a predetermined area thereof so as to directly communicate the inner space of said bowl-shaped member, in which said ballast is housed, with the outside air, said second heat discharge means being constituted by said at least one hole; wherein

said envelope means further includes a transparent material globe member attached to the open end of said bowl-shaped member so as to enclose said fluorescent tube and transmit light emitted from the fluorescent tube to the outside; wherein

said first heat discharge means includes air-duct means, integral to said bowl-shaped member, for thermally insulating said ballast from the outside air and for communicating the outside air with the space which is formed by said globe member and plate members and in which said fluorescent tube is housed; and wherein

said air-duct means includes grooves arranged substantially opposite to each other at said bowl-shaped member and having open ends on that side at which said bowl-shaped member is opened, and said plate member has recesses each having a shape corresponding to the open end of said grooves and into which the open ends of said grooves are closely fitted.

4,503,359

DISCHARGE LAMP LIGHTING DEVICE

Yoshio Watanabe, and Hiroyuki Iyama, both of Tokyo, Japan, assignors to Hitachi Lighting, Ltd., Chiba, Japan

Continuation of Ser. No. 176,687, Aug. 8, 1980,. This application Sep. 2, 1983, Ser. No. 529,127

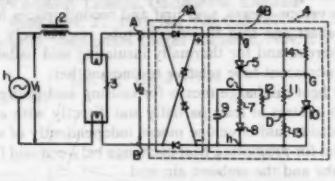
Claims priority, application Japan, Sep. 12, 1979, 54-125206[U]; Jan. 24, 1980, 55-6549[U]; Jan. 24, 1980, 55-6550[U]; May 16, 1980, 55-66217[U]

Int. Cl.³ H05B *39/00, 37/00*

U.S. Cl. 315—105 **11 Claims**

1. A discharge lamp lighting device comprising a series closed-loop circuit including an AC power supply, a ballast having an inductance, and a discharge lamp and a switch circuit connected in parallel to said discharge lamp; in which said switch circuit includes a full-wave rectifier connected across said discharge lamp, a first thyristor connected in series with a first impedance circuit between output terminals of said full-wave rectifier and being capable of being turned off by a gate signal, said first impedance circuit being connected at its one terminal in series to a cathode of said first thyristor, a

second thyristor connected between a gate of said first thyristor and the other terminal of said first impedance circuit, and



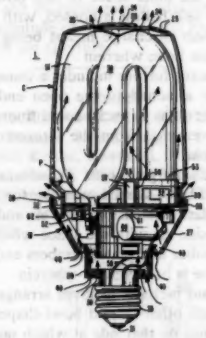
a second impedance circuit connected between a gate of said second thyristor and the cathode of said first thyristor.

4,503,360

COMPACT FLUORESCENT LAMP UNIT HAVING SEGREGATED AIR-COOLING MEANS

Denis E. Bedel, Ross Township, Allegheny County, Pa., assignor to North American Philips Lighting Corporation, New York, N.Y.

Filed Jul. 26, 1982, Ser. No. 402,003
Int. Cl.³ H01J *7/24, 17/28, 19/74, 13/32*
U.S. Cl. 315—112 **22 Claims**



1. An electric lamp unit that is adapted for use as a compact energy-efficient light source and comprises;

an electric discharge lamp that has an envelope which defines an elongated arc path and produces a light output that is adversely affected by elevated operating temperatures,

electric circuit means coupled to said discharge lamp and adapted to energize the lamp when connected to a suitable power supply,

means protectively enclosing said discharge lamp and electric circuit means comprising a housing having a first compartment that contains the discharge lamp and a second compartment that contains the electric circuit means and is physically isolated from the first compartment, and

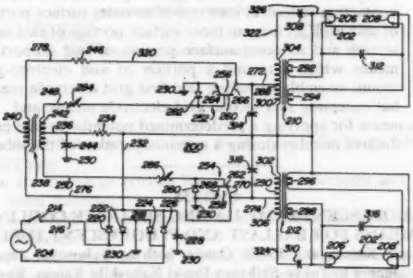
means integral with said housing defining air passageways which permit ambient air to circulate through said compartments in two different flow patterns that are confined to the respective compartments so that said compartments are air-cooled independently of one another when the lamp unit is energized and in use, said means defining air passageways having respective openings for receiving ambient air to flow into said first and second compartments and respective openings for venting heated air from inside said first and second compartments, and said openings for receiving ambient air being positioned lower than said openings for venting heated air whether the electric lamp unit is operated with said first compartment above or below said second compartment.

4,503,361

ELECTRONIC BALLAST SYSTEM

Jacques M. Haniet, Loxahatchee, Fla., assignor to Intent Patent A.G., London, England

Continuation-in-part of Ser. No. 344,155, Feb. 2, 1982,. This application Jul. 16, 1982, Ser. No. 397,524
Int. Cl.³ H05B *37/02*
U.S. Cl. 315—221 **29 Claims**



1. An electronic ballast system coupled to a DC power source for a pair of gas discharge tubes, each of said gas discharge tubes having a first and second filament, comprising:

(a) first and second autotransformers, each of said first and second autotransformers having (1) a first terminal commonly connected to one terminal of said power source and the junction point of said gas discharge tubes, (2) a tap terminal, and, (3) an output terminal connected respectively to opposite ends of said gas discharge tubes;

(b) feedback transformer means having a primary and secondary winding for establishing an oscillation signal;

(c) first and second transistor means having input electrodes coupled to a reference potential and output electrodes coupled respectively to said tap terminals of said first and second autotransformers and to opposing ends of said feedback transformer primary winding, and first and second transistor control means being connected at opposing ends of said secondary winding of said feedback transformer means for switching a current signal responsive to a feedback signal alternately through one of said transistor means;

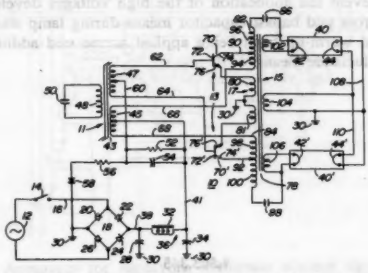
(d) first and second coupling capacitors connected on a first end in series with the output end of each of said first and second autotransformers, said coupling capacitors being coupled respectively on a second end to said first filaments of said first and second gas discharge tubes respectively for discharging a summed induced voltage signal to said first filaments; and,

(e) first and second capacitance tuning means associated with each of said gas discharge tubes, said second of which is coupled to each of said tap terminals of said first and second autotransformers respectively and said power source, said first capacitance tuning means being in shunt with said gas discharge tubes for modifying a resonant frequency and a duty factor of a signal pulse generated in said first and second autotransformers.

4,503,362
FREQUENCY STABILIZED, GAIN CONTROLLED BALLAST SYSTEM

Jacques M. Hanlet, Loxahatchee, Fla., assignor to Intent Patent A.G., Liechtenstein

Filed Jun. 1, 1983, Ser. No. 500,147
Int. Cl.³ H05B 37/02
U.S. Cl. 315—221 26 Claims



1. A frequency stabilized, gain controlled ballast system having a power source for actuating at least one gas discharge tube, comprising:

(a) frequency control means connected to said power source for establishing a substantially constant oscillation signal of predetermined frequency;

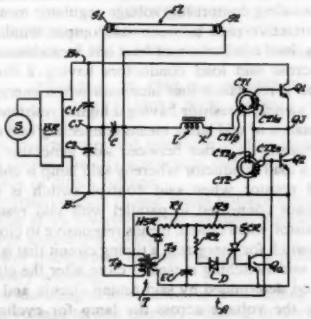
(b) switching means coupled to said frequency control means for establishing a pulsating current responsive to said substantially constant oscillation signal at said predetermined frequency; and,

(c) induction means coupled to said frequency control means and said switching means for generating a voltage across said gas discharge tube responsive to said pulsating current established by said switching means, said induction means including automatic gain control means for maintaining a gain value of said switching means to a predetermined level.

4,503,363
ELECTRONIC BALLAST CIRCUIT FOR FLUORESCENT LAMPS

Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010

Filed Feb. 22, 1983, Ser. No. 456,276
Int. Cl.³ H05B 37/02, 39/04, 41/36
U.S. Cl. 315—225 17 Claims



1. In an inverter-type fluorescent lamp ballast, said ballast comprising a pair of ballast output terminals operative to permit connection with and loading by a fluorescent lamp and to provide current-limited operating voltage therefor, the magnitude of said operating voltage being relatively large when a fluorescent lamp is not loading said ballast output and relatively low when a fluorescent lamp is loading said ballast output, said ballast also comprising a self-oscillating inverter with a pair of oscillation control terminals, said oscillation control terminals being operative upon application thereacross of a trigger pulse to cause the inverter to initiate oscillations, and, after the inverter has been initiated into oscillation, by momentary application thereacross of a relatively low impedance shunt to stop the inverter from oscillating, the improvement comprising:

voltage sensing means connected in circuit across said ballast output terminals and operative to generate a primary DC voltage across a pair of primary DC output terminals, the magnitude of said primary DC voltage being proportional to that of the voltage present across said ballast output terminals;

impedance means connected in circuit with said voltage sensing means and operative to limit the amount of current that can flow from said primary DC outut terminals;

capacitor means connected in circuit with said primary DC output terminals and operative to be charged therefrom, whereby a time-dependent secondary DC voltage is developed across said capacitor means, said secondary voltage being provided across a pair of secondary DC output terminals;

voltage threshold means connected in circuit with said secondary DC output terminals and operative, in case the magnitude of said secondary DC voltage reaches a certain pre-established threshold level, to provide a DC output current from said pair of secondary DC output terminals; and

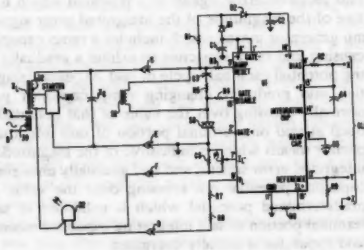
shunt means connected in circuit with said secondary DC output terminals and across said oscillation control terminals, said shunt means being operative to receive said DC output current and, as a consequence thereof, to cause a relatively low impedance shunt to be momentarily applied across said pair of oscillation control terminals, thereby to stop said inverter from oscillating;

whereby, in case the voltage across said ballast output terminals remains high enough for a time long enough to cause the magnitude of said secondary DC voltage to reach said threshold level, the inverter will cease oscillating and the voltage across said ballast output terminals will disappear.

4,503,364
PROGRAMMING AND CONTROL DEVICE FOR MODIFIED LEAD BALLAST FOR HID LAMPS

Joseph C. Engel, Monroeville, Pa., assignor to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 414,115, Sep. 2, 1982, abandoned. This application Jun. 5, 1984, Ser. No. 617,824
Int. Cl.³ G05F 1/00; H05B 37/02
U.S. Cl. 315—308 9 Claims



1. In combination with a lead-type ballast apparatus for operating a high-intensity-discharge lamp, an improved device for modifying said ballast apparatus in order to program and

control the operating performance of the high-intensity-discharge lamp as operated by said modified ballast apparatus;

said lead-type ballast apparatus having apparatus input terminals adapted to be connected across a source of AC energizing potential and apparatus output terminals across which said lamp to be operated is adapted to be connected;

said lead-type ballast apparatus comprising an inductive reactance portion and a capacitive reactance portion, said inductive reactance portion comprising a current-limiting high-reactance transformer means having primary winding means connected to said apparatus input terminals and secondary winding means terminating in secondary winding means output terminals, said capacitive reactance portion comprising capacitor means connected in circuit between said secondary winding means output terminals and said apparatus output terminals;

said modifying device comprising series-connected controllable AC semiconductor switching means and additional inductance means which are connected in parallel circuit with said capacitor means, said AC semiconductor switching means having a high impedance open position and a low impedance closed position and control terminal means, when said switching means is open said modified ballast apparatus delivers a first level of current to an operating lamp, and when said switching means is closed said modified ballast apparatus delivers a second and lower level of current to an operating lamp;

sensing and programming means operable to sense at least one predetermined lamp operating parameter and to generate an output control signal which is indicative of a predetermined parameter desired for said operating lamp, said sensing and programming means having an output connected to the gate terminal means of said switching means to control the relative proportion of time said switching means is open and closed in order to control in programmed fashion the predetermined lamp operating parameter desired for said operating lamp, the improved sensing and programming means comprising:

parameter measuring means operable to periodically measure the value of said lamp operating parameter to be controlled and to convert the measured values of said parameter into output electrical signals of a magnitude which varies in accordance with the measured values of said parameter;

error signal generating means for comparing said output electrical signals to a reference signal to generate error signals which are indicative of whether the measured values of said parameter are equal to or less than or greater than the desired value for said measured parameter;

integrating capacitor means having one terminal portion connected to receive said generated error signals, means for causing said one terminal portion of said integrating capacitor means to exhibit a predetermined potential upon initial energization of said apparatus, with said initial predetermined potential thereafter slowly modified by said received error signals to a potential which is indicative of the magnitude of the integrated error signals;

ramp generator means which includes a ramp capacitor, for causing said ramp capacitor to exhibit a gradually changing potential each half cycle of said AC energizing potential, said gradually changing ramp capacitor potential normally crossing over the value of that potential developed at said one terminal portion of said integrating capacitor means which is indicative of the magnitude of the integrated error signals, and said gradually changing ramp capacitor potential not crossing over the value of that predetermined potential which is exhibited at said one terminal portion of said integrating capacitor means when said apparatus is initially energized;

comparator means for comparing the potential at said one terminal of said integrating capacitor means with the potential developed across said ramp capacitor to generate a comparator signal output whenever the changing potential of said ramp capacitor crosses over the value of the integrated error-signal potential at said one terminal portion of said integrating capacitor means; and

drive means connected to said control terminal means of said switching means and responsive to said comparator means signal output to generate a drive signal to turn said switching means "on", whereby during lamp start-up and warm-up said switching means is maintained in an "off" condition by the initial predetermined potential exhibited at said one terminal portion of said integrating capacitor means to prevent the application of the high voltages developed across said ballast capacitor means during lamp start-up and warm-up from being applied across said additional inductance means.

4,503,365

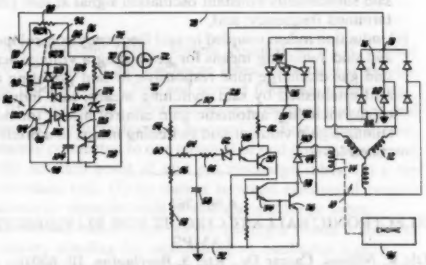
POWER SUPPLY SYSTEM FOR LOW COLD RESISTANCE LOADS

Thomas E. Kirk, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 8, 1982, Ser. No. 433,396

Int. Cl.³ H05B *39/02*

U.S. Cl. 315—310 **7 Claims**



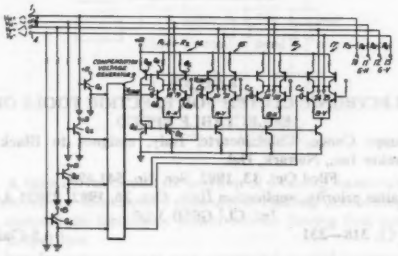
1. An electrical system for energizing an incandescent lamp load from a self-excited alternating current generator comprising, an alternating current generator having an output winding and a field winding, means for exciting said field winding from said output winding comprising voltage regulator means providing a conductive path between said output winding and field winding, load conductors, at least one incandescent lamp connected across said load conductors having a low cold resistance and a resistance that increases when energized, a lamp control switch, a resistor having a higher resistance than the cold resistance of said lamp, means connecting said control switch and resistor in series between said generator output winding and a load conductor whereby said lamp is energized through said resistor when said control switch is closed, switching means connected in parallel with said resistor to bypass the resistor when closed, means responsive to closure of said control switch for energizing a timing circuit that is operative to cause said switching means to close after the elapse of a timing period determined by said timing circuit, and means responsive to the voltage across the lamp for cycling said switching means on and off until lamp voltage is maintained above a minimum value and for thereafter maintaining said switching means closed to continuously energize the lamp through the closed switching means.

4,503,366

INDIVIDUAL DEFLECTION CONTROL SIGNALS FOR PLURAL PICKUP-TUBES IN A TELEVISION CAMERA

Takashi Nakamura, Hadano, and Yoshihiro Morioka, Atsugi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 10, 1981, Ser. No. 282,263
Claims priority, application Japan, Jul. 11, 1980, 55-95479
Int. Cl.³ H01J 29/56; H04N 9/09
U.S. Cl. 315—370 **25 Claims**



1. Apparatus for supplying deflection control signals to respective horizontal and vertical deflecting means in a plural pick-up tube television camera, comprising a source of horizontal and vertical deflecting signals; means for supplying said horizontal and vertical deflection signals directly to the respective horizontal and vertical deflecting means of a predetermined single pickup-tube of said plural pick-up tube television camera; compensating voltage generating means connected to receive said horizontal and vertical deflecting signals and selectively operative to produce therefrom respective deflection compensating voltage that vary during each horizontal and vertical scanning trace in synchronism with said respective horizontal and vertical deflecting signals for selected ones of the remaining pick-up tubes of said camera other than said predetermined single pick-up tube; and differential amplifier means connected to receive said horizontal and vertical deflecting signals and corresponding deflection compensating voltages for selectively superimposing said respective deflection compensating voltages onto corresponding ones of said horizontal and vertical deflecting signals to generate adjusted horizontal and vertical deflection signals for application to the horizontal and vertical deflecting means of said selected ones of said remaining pick-up tubes other than said predetermined single pick-up tube, whereby the deflections of said pick-up tubes are adjusted independently of one another.

4,503,367

DEFLECTION CIRCUIT WITH LINEARITY CORRECTION

Werner F. Wedam, Lawrenceville, and William E. Babcock, Warren, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 22, 1982, Ser. No. 360,751
Int. Cl.³ H01J 29/56, 29/70
U.S. Cl. 315—371 **7 Claims**

1. An inverter supplied television display system with deflection circuit linearity correction, comprising:

a source of direct voltage;

an inverter coupled to said direct voltage source for developing at an inverter output terminal a generally square-wave alternating voltage;

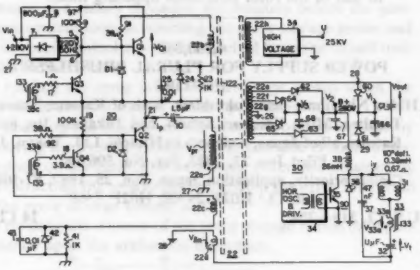
a power transformer having a primary winding and a secondary winding;

means including a capacitance for AC coupling said alternating voltage to said primary winding to develop an alternating polarity voltage across said primary winding having rounded tops that are more rounded than that of said square-wave alternating voltage;

a deflection winding;

a deflection generator coupled to said deflection winding for generating scanning current therein;

a third winding of said power transformer coupled to receive scanning current and to apply to said deflection winding the alternating polarity voltage developed across said third winding, said alternating voltage across said third winding also having rounded tops that are more



rounded than that of said square wave alternating voltage; and

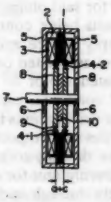
synchronizing means coupled to said inverter and responsive to a deflection rate voltage synchronized with scanning current generation for synchronizing inverter operation so as to enable the rounded top alternating polarity voltage across said third winding to provide substantial linearity correction to said scanning current.

4,503,368

PERMANENT MAGNET TYPE STEPPING MOTOR

Masafumi Sakamoto, Kiryu, Japan, assignor to Japan Servo Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1983, Ser. No. 553,849
Claims priority, application Japan, May 9, 1983, 58-79419
Int. Cl.³ H02K 37/00
U.S. Cl. 310—49 R **4 Claims**



1. A permanent magnet type stepping motor having a rotor that defines an axis and comprises a substantially disc-like permanent magnet coaxially sandwiched between a pair of pole pieces each of which as cicumferentially spaced rotor pole teeth around its periphery, and a stator having a core that comprises a cylindrical yoke and magnetic poles projecting radially inwardly from said yoke, each having circumferentially spaced stator pole teeth at its radially inner tip that radially oppose said rotor pole teeth across a gap, and a winding around each of said magnetic poles, said stepping motor being characterized by:

A. said magnetic poles having a thickness, measured parallel to said axis, that is substantially equal to the sum of the axial lengths of the two pole pieces;

B. the stator pole teeth being disposed in two groups substantially similar to one another,

(1) each said group comprising circumferentially spaced

stator pole teeth that are axially outwardly offset in relation to the magnetic poles, and

(2) said groups being spaced apart axially by a distance substantially equal to the axial length of the permanent magnet so that the stator pole teeth of each group oppose the rotor pole teeth of one of the pole pieces; and

C. the stator pole teeth of each group having a thickness, measured parallel to said axis, which is substantially equal to that of the rotor pole teeth opposing them.

4,503,369

POWER SUPPLY FOR PLURAL BRUSHLESS DC MOTORS

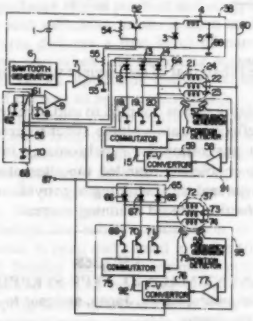
Hideo Nishijima; Isao Fukushima, both of Katsuta; Tsunehiko Teshima, Mito; Yasunori Kobori, and Takayasu Ito, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 22, 1983, Ser. No. 506,896

Claims priority, application Japan, Jun. 25, 1982, 57-108401

Int. Cl.³ H02K *29/02*; H02P *7/68*

U.S. Cl. 318—254 **14 Claims**



1. A power supply for a plurality of motors each including a plurality of motor driving coils, said power supply comprising:

a variable voltage supply device for supplying a voltage to said plurality of driving coils of each of said plurality of motors;

a plurality of motor driving units provided respectively correspondingly for said plurality of motors, each of said motor driving units being connected between said variable voltage supply device and said plurality of motor driving coils of an associated one of said motors so as to cause the associated motor to rotate under a predetermined rotational condition, each of at least two of said plurality of motor driving units including, (a) a plurality of current control devices respectively connected to said plurality of motor driving coils of the motor associated with the motor driving unit for controlling currents to be passed respectively through said motor driving coils, (b) a commutator device connected to said plurality of current control devices for controlling the conduction period and amplitude of each of the currents flowing through said current control devices, and (c) a detecting device for detecting a signal related to both a voltage value applied to said plurality of motor driving coils of the associated motor and a voltage value appearing at said current control devices connected to said motor driving coils; and

a control signal generating device for selecting one of signals detected by the respective detecting devices of said at least two motor driving units, said selected one signal corresponding to the motor driving coils of one of said motors which requires the highest one of the voltages required by the plurality of motor driving coils of said respective motors, said control signal generating device producing a control signal on the basis of said selected one of said detected signals,

said variable voltage supply device including a reference voltage means for providing a reference voltage, a comparator means for comparing a voltage of said control signal with said reference voltage, and a control means responsive to an output of said comparator means for controlling an output voltage of said variable voltage supply device.

4,503,370

ELECTRONIC CLUTCH FOR ELECTRIC TOOLS OF SELECTABLE SPEED

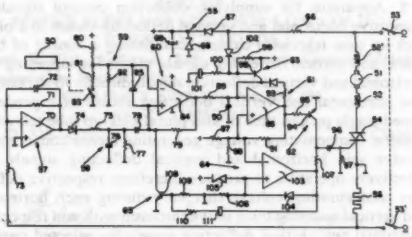
Guiseppe Cuneo, Calolziocorte, Italy, assignor to Black & Decker Inc., Newark, Del.

Filed Oct. 13, 1983, Ser. No. 541,695

Claims priority, application Italy, Oct. 26, 1982, 23931 A/82

Int. Cl.³ G05B *5/00*

U.S. Cl. 318—331 **5 Claims**



1. An electronic clutch, for an electric tool, in combination with a motor speed change device for selecting different speeds of operation of the tool's motor, the electronic clutch comprising:

voltage sensor means for generating an output voltage proportional to the current drawn by the tool's motor;

reference voltage generator means for generating a reference voltage;

a comparator having inputs connected respectively to said voltage sensor means and said reference voltage generator means and arranged to compare said generated voltages with each other and produce an output dependent upon such comparison;

an electronic circuit to which the output of said comparator is connected and arranged to interrupt the power supply to the tool's motor when said comparator determines that the output voltage generated by said voltage sensor means exceeds said reference voltage;

a voltage varying device included in one of said means and coupled to said motor speed change device, said voltage varying device proportionally varying the voltage generated by said one of said means in accordance with the operating speed selected for the tool's motor;

a differentiating circuit connected between the output of said voltage sensor means and the respective input of said comparator;

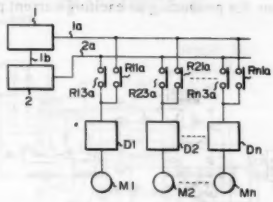
an inhibitor circuit arranged to prevent operation of said differentiating circuit for a predetermined time at the instant the tool's motor is started; and said inhibitor circuit comprising a transistor having a collector connected to said comparator, an emitter connected to ground, and a base connected to ground via a resistor, said base also being connected via a capacitor and a resistor to said electronic circuit.

4,503,371

MASS DRIVER CIRCUIT FOR WEAVING LOOMS

Katsuhiko Sugita, Ishikawa, Japan, assignor to Tsudakoma Kogyo Kabushiki Kaisha, Japan

Filed Oct. 21, 1982, Ser. No. 438,359
Int. Cl.³ H02P 5/34
U.S. Cl. 318—443 4 Claims



1. A mass driver circuit for a group of weaving looms which are driven for substantially concurrent running comprising

a commercial frequency power source having first power output line,

a low frequency power unit connected to said commercial frequency power source, having second power output line and capable of lowering the frequency of the electric power supplied by said commercial frequency power source, and

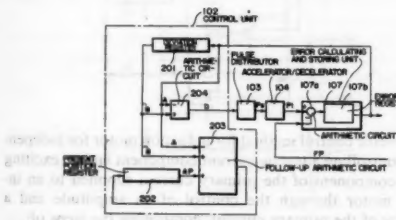
induction drive motors arranged, one for each, at said weaving looms, each said drive motor being connected to said first output line via a start switch and to said second output line via an inching switch so that each said drive motor should be selectively connected to said commercial frequency power source at normal running of each said weaving loom and to said low frequency power unit at inching operation of each said weaving loom.

4,503,372

METHOD AND APPARATUS FOR SENSING PRESENT POSITION IN POSITION CONTROL SYSTEM

Ryoichiro Nozawa, Tokyo; Hidetsugu Komiya; Hajimu Kishi, both of Hino; Hitoshi Matsuura; Etsuo Yamazaki, both of Hachioji, and Hiroshi Sakurai, Hino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

Filed Nov. 17, 1982, Ser. No. 442,422
Claims priority, application Japan, Nov. 25, 1981, 56-188594
Int. Cl.³ G05B 19/28
U.S. Cl. 318—560 13 Claims



1. A method for sensing the present position of a machine element in a position control system, operatively connectable to receive a feedback quantity and a steady deviation, when a connection between an error storage means and a speed control circuit is severed to place a position control loop in an open state, the position control system including error storage means for storing an error between a commanded magnitude produced by a control unit, for storing the feedback quantity and for storing the steady deviation, a speed control circuit connected to the error storage means for controlling a motor in accordance with the error, and having a position sensor mounted on the motor shaft or on a movable machine element driven by the motor, the position control system further including a present position register for storing a present position of the machine element, and a position control loop wherein an amount of movement sensed by the position sensor is applied to the error storage means as the feedback quantity, said method comprising the steps of:

(a) reading and storing the error from the error storage means as a steady deviation immediately before the position control loop, connecting the error storage means and the speed control circuit, is switched from the closed state to the open state;

(b) reading the error in the error storage means when the position control loop is in the open state;

(c) updating the content of the present position register by storing the present position of the machine element determined on the basis of an arithmetic difference obtained by subtracting the steady deviation from the error read from the error storage means; and

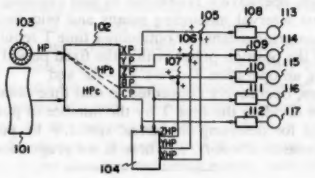
(d) revising the content of the error storage means in dependence upon the arithmetic difference.

4,503,373

NUMERICAL CONTROL SYSTEM

Ryoichiro Nozawa, Tokyo; Tsuyoshi Nagamine; Hideaki Kawamura, both of Hachioji, and Toshiaki Ohtsuki, Hino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP81/00314, § 371 Date Jun. 18, 1982, § 102(e) Date Jun. 18, 1982, PCT Pub. No. WO82/01600, PCT Pub. Date May 13, 1982
PCT Filed Oct. 29, 1981, Ser. No. 394,915
Claims priority, application Japan, Oct. 29, 1980, 55-151579
Int. Cl.³ G05B 19/25
U.S. Cl. 318—570 2 Claims



1. In a numerical control system having a table, and a tool with a tool axis and a center of rotation Q(x, y, z), the tool and the table capable of being rotated in the vertical direction about a B axis and in the horizontal direction about a C axis so as to control the tool axis direction of the tool relative to a workpiece mounted on the table, and the table and tool being capable of movement in the directions of X-, Y- and Z-axes so as to subject the workpiece to desired three-dimensional machining, the numerical control system comprising:

means for manually commanding rotational movement of the tool about the center of rotation Q;

evaluation means for evaluating variations ΔX, ΔY and ΔZ by which the relative positional relation between the nose of the tool and the workpiece changes due to the rotation; and

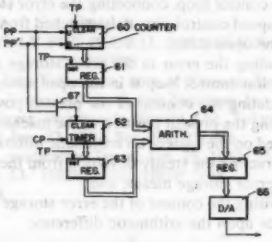
pulse distribution means, repsonsive to said evaluation means, for performing calculations on the basis of said variations to move said tool or said table with respect to each other in the X, Y- and Z-axial directions, so as to maintain the relative positional relation between the nose of said tool and said workpiece as before the manually commanded rotation.

4,503,374

SPEED DETECTION APPARATUS AND METHOD

Tetsuro Sakano, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

Filed Jul. 15, 1983, Ser. No. 514,315
Claims priority, application Japan, Jul. 15, 1982, 57-123284
Int. Cl.³ G05B 5/01
U.S. Cl. 318—616 9 Claims



1. A speed detection apparatus for a motor, in which a position detector generates position pulses and an actual speed V of the motor is detected from the position pulses generated by the position detector operatively connected to the motor, and the actual speed is compared with a commanded speed in order to control the motor, said apparatus comprising:

means, operatively connected to the position detector to receive the position pulses, for counting a number of the position pulses received within a fixed period To;

means, operatively connected to the position detector, for measuring a first interval T1 between a prior position pulse generated just prior to the fixed period To and an instant at which the fixed period begins;

means, operatively connected to the position detector, for measuring a second interval T2 between a final position pulse generated in the fixed period To and an instant at which the fixed period ends;

means, operatively connected to said counting means, said first interval measuring means and said second interval measuring means, for obtaining a time T required for input of the position pulses within the fixed period by performing an operation $T=To+T1-T2$; and

means, operatively connected to said time obtaining means, for dividing the time T by the number of position pulses, and for detecting the actual speed V by performing an operation $V=K\cdot N/T$, where K is a proportional constant.

4,503,375

METHOD FOR CONTROLLING INDUCTION MOTOR AND APPARATUS THEREFOR

Toshiaki Okuyama, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 22, 1984, Ser. No. 582,542
Claims priority, application Japan, Feb. 23, 1983, 57-29141
Int. Cl.³ H02P 5/40
U.S. Cl. 318—802 10 Claims

1. An induction motor controlling apparatus comprising:

an induction motor driven by a power inverter;

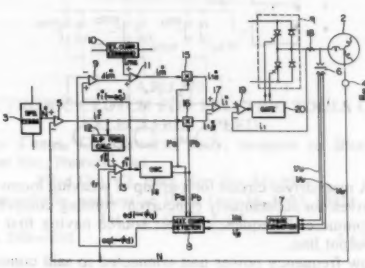
speed control means responsive to a difference between a speed command and an actual speed value, for producing a torque command for said induction motor;

slip frequency calculation means for producing a slip frequency command corresponding to a magnitude of said torque current command;

voltage component detection means detecting motor voltage of said induction motor, for producing a parallel component and an orthogonal component of the motor voltage with respect to an exciting current component which is determined in a control system for the motor voltage;

primary frequency command means responsive to said slip frequency command, actual speed value and parallel component of the motor voltage detected by said voltage component detector, for producing a primary frequency command having a magnitude that makes a said parallel component of the motor voltage zero;

exciting current command means responsive to an exciting current setting value and the orthogonal component of the motor voltage detected by said voltage component detector means, for producing an exciting current pattern signal



having an amplitude that sets said orthogonal component of the motor voltage at a preset value;

torque current command means responsive to said torque current command and primary frequency command, for producing a torque current pattern signal; and

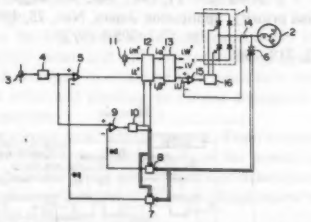
current control means responsive to said torque current pattern signal and exciting current pattern signal, for controlling output current of said power inverter.

4,503,376

CONTROL METHOD FOR INDUCTION MOTORS

Toshiaki Okuyama, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 4, 1983, Ser. No. 538,793
Claims priority, application Japan, Oct. 4, 1982, 57-173184
Int. Cl.³ H02P 5/40
U.S. Cl. 318—802 4 Claims



1. A vector control method for induction motor for independently controlling a torque current component and an exciting current component of the primary current supplied to an induction motor through the control of an amplitude and a frequency of the primary current, comprising the steps of:

detecting a motor voltage of said induction motor;

resolving said motor voltage into a vector component e_d parallel with an exciting current component of the primary current and a vector component e_q orthogonal to said exciting current component vector; and

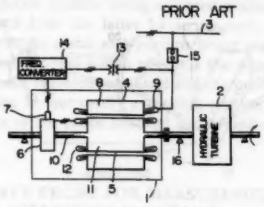
controlling a frequency of said primary current so that said vector component e_d of said motor voltage is zeroed, while at the same time controlling said primary current corresponding to a difference between said vector component e_q and a speed command signal, thereby to control the speed of said induction motor.

4,503,377

VARIABLE SPEED ROTARY ELECTRIC MACHINE

Yukio Kitabayashi; Noriyoshi Takahashi; Masatoshi Watanabe, all of Hitachi; Toshiaki Okuyama, Ibaraki, and Yoji Tanaka, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 4, 1984, Ser. No. 568,264
Claims priority, application Japan, Jan. 14, 1983, 58-3436
Int. Cl.³ H02P 5/34
U.S. Cl. 318—807 7 Claims



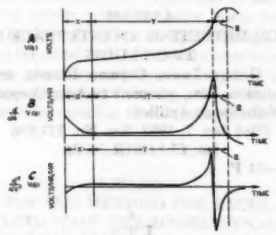
1. A variable speed rotary electric machine, comprising a stator having first and second stator windings wound on a stator core and a cage rotor mounted rotatably within said stator and including a rotor core and rotor conductors constituting a cage rotor winding, wherein said first stator winding is connected to an AC power supply of a constant frequency while said second stator winding is connected to a power supply of variable frequency, said first and second stator windings being so wound as to form magnetic poles in numbers differing from each other, the rotor conductors of said cage rotor being electromagnetically coupled with magnetic fluxes generated by said first and second stator windings and so disposed as to form magnetic poles whose number is intermediate between the number of magnetic poles formed by said first stator winding and the number of magnetic poles formed by said second stator winding.

4,503,378

CHARGING SYSTEM FOR NICKEL-ZINC BATTERIES

Richard A. Jones, Anderson, and William D. Reoch, Middletown, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed May 2, 1983, Ser. No. 490,425
Int. Cl.³ H02J 7/04; H01M 10/44
U.S. Cl. 320—20 3 Claims



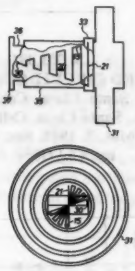
1. A method of charging a nickel-zinc battery, comprising:
supplying the battery with charging current such that the battery exhibits a charging voltage which increases over time toward a maximum and such that the slope of the charging voltage increases and then decreases as the charging voltage approaches the maximum;
measuring the battery voltage magnitude at predetermined intervals during the entire course of the charging process, and after the occurrence of at least three such intervals determining a slope value at each subsequent interval according to the difference between the most recently measured voltage magnitude and a voltage magnitude measured at least two intervals prior thereto; and
terminating the supply of charging current in substantial relation to the inflection point at which the measured slope values change from increasing to decreasing to thereby improve battery life.

4,503,379

ROTATION OF MICROWAVE SIGNAL POLARIZATION USING A TWISTABLE, SERPENTINE-SHAPED FILAMENT

Clifford Raiman, Roselle, Ill., assignor to Chaparral Communications, Inc., San Jose, Calif.

Filed Apr. 12, 1983, Ser. No. 484,255
Int. Cl.³ H01P 1/165
U.S. Cl. 333—21 A 10 Claims



1. Apparatus for rotating the polarization of a signal comprising:
a hollow, circular waveguide having signal receiving and signal transmitting ends;
rotatable mounting means coaxially mounted to the circular waveguide near the receiving and thereof;
a continuous, serpentine-shaped, electrically-conductive filament formed into a series of interconnected legs and having an end-leg at each end thereof, mounted in the circular waveguide such that the interconnected legs are transverse to the propagating signal therein at approximately the diameter thereof, one end-leg being fixedly mounted to the rotatable mounting means, and the other end-leg being rigidly affixed at the signal transmitting end of the circular waveguide;
the legs of the filament being selectively rotatable around the longitudinal axis of the circular waveguide in response to rotation of the rotatable mounting means.

4,503,380

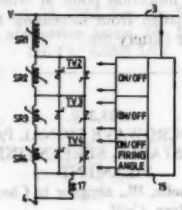
STATIC REACTIVE COMPENSATOR

Hemesh L. Thanawala, Stafford, England, assignor to Associated Electrical Industries Limited, England

PCT No. PCT/GB82/00186, § 371 Date Feb. 25, 1983, § 102(e) Date Feb. 25, 1983, PCT Pub. No. WO83/00071, PCT Pub. Date Jan. 6, 1983
PCT Filed Jun. 25, 1982, Ser. No. 476,958
Claims priority, application United Kingdom, Jun. 25, 1981, 8119611
Int. Cl.³ G05F 1/70
U.S. Cl. 323—206 14 Claims

1. A polyphase static reactive compensator comprising a plurality of alternating current saturated reactors connected in series between supply terminals, some of said saturated reactors having controllable bypass paths and means for control-

ling said bypass paths selectively so that a composite voltage/-current characteristic can be obtained by short-circuiting said



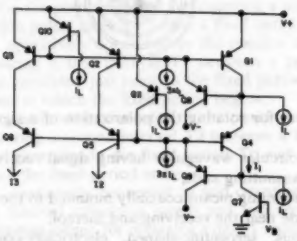
saturated reactors progressively with increasing supply voltage, thus reducing the effective slope impedance.

4,503,381

INTEGRATED CIRCUIT CURRENT MIRROR

Derek F. Bowers, Santa Clara, Calif., assignor to Precision Monolithics, Inc., Santa Clara, Calif.

Filed Mar. 7, 1983, Ser. No. 472,963
Int. Cl.³ G05F 3/16
U.S. Cl. 323—315 9 Claims



1. In an integrated circuit current mirror circuit formed on a substrate and including a bipolar reference current transistor, current source means directing a reference current through the collector-emitter circuit of the reference transistor, at least one bipolar slave transistor, the reference current and slave transistors each being characterized by base-substrate leakage currents and having a common base connection and their collector-emitter circuits connected in circuit with a voltage source terminal of a first polarity, and a bipolar current supply transistor with its collector-emitter circuit connected between said common base connection and a voltage supply terminal of a second polarity to supply the base and leakage currents of the reference and slave transistors, said current supply transistor also characterized by a base-substrate leakage current, the improvement comprising:

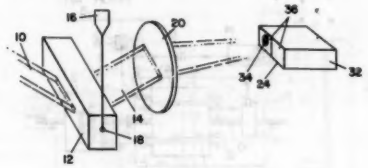
a bipolar compensation transistor having its collector-emitter circuit connected between a voltage supply terminal of said first polarity and said common base connection, and its base unconnected to the remainder of the current mirror circuit and providing a leakage current to the substrate, said compensation transistor supplying its collector-emitter current to the common base connection and thereby to the collector-emitter circuit of the current supply transistor, said compensation transistor being configured to provide a collector-emitter current of sufficient magnitude to maintain the current supply transistor in a conductive state at elevated temperatures independent of the current through the reference and slave transistors.

4,503,382

METHOD AND DEVICE FOR CENTROID DETECTION OF A BEAM OF ELECTROMAGNETIC ENERGY

Otis G. Zehl, College Park; Michael G. Price, Seabrook, and Edward H. David, Jr., College Park, all of Md., assignors to Litton Systems, Inc., College Park, Md.

Filed Oct. 18, 1982, Ser. No. 435,108
Int. Cl.³ G01R 23/16
U.S. Cl. 324—77 K 12 Claims



1. A device for detecting the centroid of a beam of electromagnetic energy, comprising:

means for forming a beam of electromagnetic energy having a centroid;

means for varying the location of said beam and said centroid thereof from a nominal location along an axis;

photodetector means comprising first and second photodetectors having a separation therebetween which is located at said nominal location of said centroid;

means for measuring the intensity of said beam upon said photodetectors to produce an output signal proportional to said intensity of said beam upon each photodetector;

means for measuring the difference between said output signal from each photodetector wherein said measured difference represents the variation of said centroid from said nominal location;

means for measuring the sum of said output signals from each photodetector;

means for dividing said measured difference by said measured sum of said output signals, wherein variations in the amplitude of said beam of electromagnetic energy are corrected by said device; and

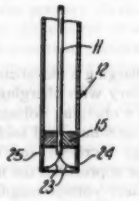
said separated photodetectors each including a first electrode of a first polarity and a second electrode of opposite polarity, said fist electrode being of the single type and said second electrode being of the divided type.

4,503,383

DEVICE FOR DETECTING AN INTERFACE BETWEEN TWO FLUIDS

Joram Agar, George Town, Cayman Islands, and Klaus J. Zanker, Houston, Tex., assignors to Agar Corporation, N.V., Curacao, Netherlands Antilles

Filed Jan. 7, 1982, Ser. No. 337,836
Int. Cl.³ G01R 27/26
U.S. Cl. 324—61 P 12 Claims



1. A device for detecting an interface between oil and water, which are two fluids of differing impedance, said device having an electrical circuit comprising transmitting means, a de-

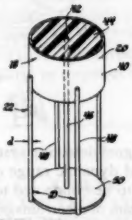
tector and at least one probe; said transmitting means being arranged to transmit electrical impulses to one of said two fluids by way of a probe so that the passage of these impulses through said fluid will be affected by the impedance of the latter; the detector being arranged to receive said impulses from the probe so as to detect a change in said impedance which occurs at said interface; and each said probe being adapted to extend into said fluid and comprising an electrically conductive probe member and a grounded electrically conductive shield, the probe member being mounted within the shield and being spaced from the latter by an air core, the probe member, adjacent its distal end portion being sealed to the shield by a dielectric seal which prevents the ingress of said fluid into the space between the shield and the probe member, the shield having an outwardly extending portion which extends outwardly of the probe member and of said seal.

4,503,384

MICROWAVE PROBE FOR MEASUREMENT OF DIELECTRIC CONSTANTS

Louis L. Nagy, Warren, and Michael J. O'Rourke, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 28, 1982, Ser. No. 372,470
Int. Cl.³ G01R *27/04*
U.S. Cl. 324—61 P **3 Claims**



1. A microwave probe for measuring the dielectric constant of a liquid comprising:

a coaxial cable having an outer conductive sheath and a concentrically located inner wire, and

a cage-like tip attached to an end of the coaxial cable including a center wire connected to the said inner wire, a three to five outer wires each connected at one end to the sheath and surrounding the center wire, the outer wires being spaced sufficiently to facilitate free flow of liquid through the tip, and means shorting the distal ends of the said center wire and outer wires; the wire geometry and number of wires being so selected that the impedance of the tip, when immersed in the liquid, substantially matches the impedance of the coaxial cable.

4,503,385

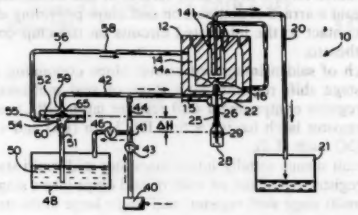
APPARATUS AND METHOD FOR REGULATING SHEATH FLUID FLOW IN A HYDRODYNAMICALLY FOCUSED FLUID FLOW SYSTEM

John L. Haynes, Chapel Hill, N.C., assignor to Becton, Dickinson and Company, Paramus, N.J.

Filed Jul. 11, 1983, Ser. No. 512,267
Int. Cl.³ G01N *27/00*
U.S. Cl. 324—71.4 **16 Claims**

1. In a hydrodynamically focused fluid flow system of the type having an aperture through which particles to be analyzed flow, air flow means associated with a sample fluid containing said particles for causing said particles to flow through said aperture, sheath fluid flow means for providing a flow of sheath fluid around said sample fluid for focusing said particles which flow through said aperture, and means for analyzing said particles which flow through said aperture, wherein the improvement comprises:

an antechamber in fluid communication with said air flow means, said sheath fluid flow means and a sheath fluid reservoir containing said sheath fluid, said reservoir also being in fluid communication with said air flow means, said antechamber including a first operable valve which allows sheath fluid to flow from said reservoir to said



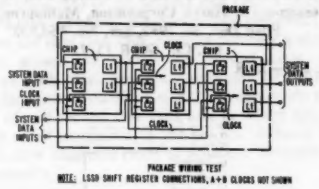
antechamber but restricts reverse flow if the pressure in the antechamber is higher than the pressure in the reservoir, said antechamber including a second operable valve which closes when the antechamber is full of sheath fluid and prevents sheath fluid from flowing into said air flow means, whereby flow of sheath fluid toward said aperture and flow of air for forcing said particles from the sample fluid through said aperture in a hydrodynamically focused flow are established.

4,503,386

CHIP PARTITIONING AID (CPA)-A STRUCTURE FOR TEST PATTERN GENERATION FOR LARGE LOGIC NETWORKS

Sumit DasGupta, Wappingers Falls; Matthew C. Graf, Highland; Robert A. Rasmussen, LaGrangeville, all of N.Y., and Thomas W. Williams, Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 20, 1982, Ser. No. 370,214
Int. Cl.³ G01R *31/28*
U.S. Cl. 324—73 R **19 Claims**



1. An integrated circuit packaging structure said packaging structure comprising:

a substrate having a first planar surface and a second planar surface oppositely disposed from said first planar surface, said first planar surface containing n arrays of closely spaced contacts, said second planar surface of said substrate containing an array of contacts, said contacts of said array contained on said second planar surface of said substrate being more widely spaced apart, one from another, than said contacts of each of said n arrays of contacts;

first passive circuit means contained at least in part in said substrate for interconnecting said contacts of said n arrays contained on said first planar surface of said substrate and said contacts of said array of contacts contained on said second planar surface of said substrate;

n integrated circuit chips, each of said n integrated circuit chips including receiver circuit means, internal functional

circuit means and off chip driver circuit means, each of said n integrated circuit chips having a first planar surface and a second planar surface oppositely disposed from said first planar surface; each of said n integrated circuit chips having an array of contacts on said first planar surface thereof, said array of contacts of each of said n integrated circuit chips respectively corresponding to, and electrically connected to one of said n arrays of contacts contained on said first planar surface of said substrate, each of said n arrays of contacts on said chips providing electrical contact to the integrated circuits on the chip connected thereto;

each of said n integrated circuit chips containing a multi-stage shift register, each stage of said multi-stage shift register comprising a shift register latch (SRL) each shift register latch having a first DC latch (L1) and a second DC latch (L2);

circuit means serially interconnecting said multi-stage shift register contained on each of said chips into a single large multi-stage shift register, said single large multi-stage shift register having input means, output means and control means, said input means, output means and said control means being respectively accessible via a predetermined limited number of said contacts of said array of contacts contained on said second planar surface of said substrate, each multi-stage shift register on each of said n chips having at least a first portion and at least a second portion, said first portion of said multi-stage shift register on each of said n chips being additionally connected at least in part between said receiver circuit means and said internal functional circuit means of said chip and said second portion of said multi-stage shift register on each of said n chips being additionally connected at least in part between said internal functional circuit means and off-chip driver circuit means of said chip; and

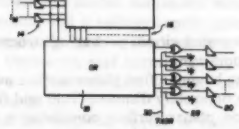
n additional circuit means, each of said n additional circuit means being connected between the multi-stage shift register on a discrete one of said n integrated circuits and at least a predetermined one of said contacts of said array of contacts on said second planar surface of said substrate.

4,503,387

A.C. TESTING OF LOGIC ARRAYS

David L. Rutledge, and Barbara J. Fisher, both of Palm Bay, Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Dec. 30, 1982, Ser. No. 454,533
Int. Cl.³ G01R *15/12*
U.S. Cl. 324—73 R **13 Claims**



1. In a logic array including a logical AND matrix, a plurality of input buffer means having a true and a complement output connected to the input of said logical AND matrix, a logical OR matrix connected to the output of said logical AND matrix and a plurality of output buffer means connected to the output of said logical OR matrix, the improvement comprising testing means for testing said input and output buffer means including:

means for disabling said logical AND matrix in response to a first test signal;

first means for connecting said true or complement output of each of said input buffer means to each of said output buffer means in response to a second test signal;

second means for connecting said true or complement output, not connected by said first connecting means, of each of said input buffer means to each of said output buffer means in response to a third test signal;

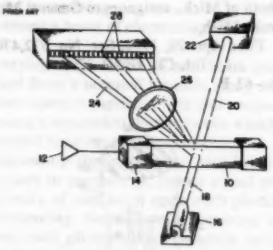
whereby said input and output buffers are tested by providing said first and either said second or third test signals, addressing said input buffer means and monitoring the output of said output buffer means.

4,503,388

ACOUSTO-OPTIC SIGNAL DETECTION SYSTEM

Otis G. Zebl, College Park; Michael G. Price, Seabrook; Edward H. David, Jr., College Park, and Jerome C. Kremen, Takoma Park, all of Md., assignors to Litton Systems, Inc., College Park, Md.

Filed Oct. 18, 1982, Ser. No. 435,098
Int. Cl.³ G01R *27/02*
U.S. Cl. 324—77 K **10 Claims**



1. An acousto-optic signal detection system of the Bragg cell variety having improved dynamic range comprising:

a Bragg cell adapted to be connected to a signal source;

means for passing a beam of electromagnetic energy through said Bragg cell to form an undeflected beam portion and a first order beam portion;

light amplification means responsive to said first order beam in less than one microsecond, operably disposed for receiving said first order beam at an input thereof and for outputting a secondary amplified first order beam at an output thereof;

photodetector means operably disposed to receive said amplified first order beam at an input thereof and for generating an output signal at an output thereof which is a function of the frequency of the signal entering said Bragg cell;

fiber optic means operably disposed for receiving said first order beam at an input thereof and for spreading said first order beam at an output thereof before said beam is received by said light amplification means.

4,503,389

PORTABLE DC DEVICE FOR VERIFYING ABSENCE OF VOLTAGE IN HIGH-TENSION AC CONDUCTORS

Edouard Singer, 53 Rue de Mulhouse, 68790 Morschwiller-Le-Bas, France

Filed Mar. 22, 1982, Ser. No. 360,392
Claims priority, application France, Mar. 26, 1981, 81 06259
Int. Cl.³ G01R *19/155, 19/165, 19/22*
U.S. Cl. 324—133 **13 Claims**

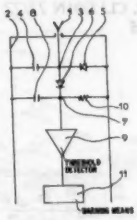
1. A device for determining whether electrical equipment carries an alternating current that could endanger maintenance personnel or others in contact with the equipment, comprising:

a protective conductive shield in the form of a container serving as a local ground for said device;

a conductive probe mounted within said shield and extending beyond said shield for making electrical contact with said equipment;

first diode means positioned within said shield and connected directly to said probe and second diode means connected between said shield and said probe for rectifying at least some of any alternating current carried by said probe as a result of said contact to produce a unipolar signal;

a capacitive divider means operatively associated with said shield for directing only a portion of the current carried by said probe to said rectifying means, said divider means



including (1) a capacitor means connected from the probe to said shield and (2) said shield in combination with earth ground;

threshold detecting means within said shield and connected directly to the first diode means for generating an output signal when the voltage of said unipolar signal exceeds a predetermined threshold; and

alarm means connected to said threshold detecting means for generating an alarm in response to said output signal.

4,503,390

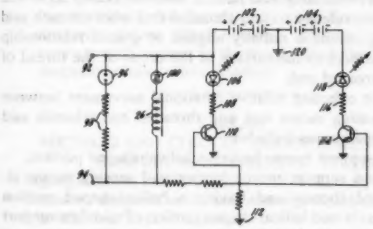
SWITCHLESS VOLTAGE, CONTINUITY AND POLARITY INDICATOR

Peter M. Wells, Jr., Sycamore, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.

Continuation of Ser. No. 261,525, May 7, 1981, abandoned. This application Aug. 19, 1983, Ser. No. 524,225

Int. Cl.³ G01R *19/00, 19/16*

U.S. Cl. 324—133 **3 Claims**



1. In a voltage tester of the solenoid type, a housing, a pair of leads extending from the housing with contact prods on the ends thereof, a solenoid and circuit therefor in the housing and connected to the leads for indicating the voltage of a voltage source when the prods are placed in contact therewith, polarity indicating means in the housing and connected to the leads, and a battery and battery operated continuity circuit in the housing connected to the solenoid circuit and to the polarity indicating means for using the polarity indicating means to signal continuity of lack thereof when the prods are put in contact with each other.

4,503,391

ROTARY ANGULAR POSITION SENSOR WITH MAGNET AND POLE DISK ASSEMBLY MOUNTED ON ROTATABLE SHAFT

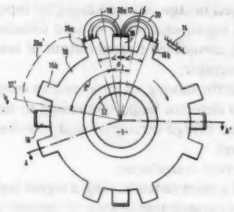
Walter Hinke, Ludwigsburg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 14, 1982, Ser. No. 434,180

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1982, 3208721

Int. Cl.³ G01B *7/14;* **G01P** *3/487*

U.S. Cl. 324—208 **9 Claims**



1. Rotary angular position sensor system, for producing bipolar, low-jitter output signals, adapted to be mounted on a rotatable shaft, said system comprising

the rotatable shaft (**1**);

a first magnetic pole disk (**10**) and a second magnetic pole disk (**11**), each mounted on said shaft;

a magnet located between said pole disks;

projecting pole shoes (**15,16**) located at the ends of the pole disks, projecting circumferentially therefrom, and being formed as claws which are axially angled and extending from one pole disk towards the other;

and a stationary magnetic field responsive element (**14**) located in magnetically coupled relation with respect to the claws,

wherein, in accordance with the invention,

the claws of the first pole disk (**10**) are circumferentially located on the disk and form spaced pairs of claw elements (**15***a*,**15***b*), in which the elements have identical magnetic polarity and are spaced from each other;

and each claw (**16**) of the second disk (**11**) is circumferentially interdigited between the spaced claw elements (**15***a*,**15***b*) of a pair of the first disk (**10**), thereby defining a plurality of three-claw groups, in which the spaced claw elements (**15***a*,**15***b*) of each claw group are disposed substantially the same angular distance on either side of the oppositely polarized claw (**16**) of said second disk (**11**), and in which said angular distance is small compared to the angular distance between respective claw elements (**15***b*) of adjacent different pairs of claw elements.

4,503,392

APPARATUS FOR NON-DESTRUCTIVE TESTING OF SPOT WELDS USING AN ELECTROMAGNETIC FIELD

Viktor S. Fastritsky; Laimonis T. Vingris, both of Riga; Vasily V. Ardentov; Jury B. Florinsky, both of Leningrad; Viktor I. Plotnikov, Tolyatti; Leonid A. Rodnevsky, Tolyatti, and Gennady N. Alexeev, Tolyatti, all of U.S.S.R., assignors to Rizhsky Politekhnichesky Institut, Riga, U.S.S.R.

Filed Jul. 21, 1981, Ser. No. 285,556

Int. Cl.³ G01N *27/82, 27/90;* **G01R** *33/12*

U.S. Cl. 324—232 **2 Claims**

1. An apparatus for nondestructive testing of spot welds by comparing eddy currents induced in the weld zone by means of high- and low-frequency electromagnetic fields, comprising:

a high-frequency measuring channel including:

a high-frequency signal generator for generating a high-frequency electromagnetic field that penetrates only the surface area of the weld zone and having an output;

an unbalanced bridge circuit having an input, an output, and a control input, said input of said unbalanced bridge circuit being connected to said output of said high-frequency signal generator;

a phase detector having an input and an output, said input of said phase detector being connected to said output of said unbalanced bridge circuit of said high-frequency measuring channel;

a low-frequency measuring channel comprising:

a low-frequency signal generator for generating a low frequency electromagnetic field that penetrates the interior of the weld zone and having an output;

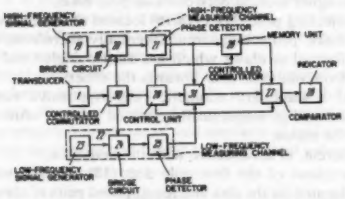
an unbalanced bridge circuit having an input, an output and a control input, said input of said unbalanced bridge circuit being connected to said output of said low-frequency signal generator;

a phase detector having an input and an output, said input of said phase detector being connected to said output of said unbalanced bridge circuit of said low-frequency measuring channel;

an eddy current transducer;

a controlled commutator having a signal input connected to said eddy current transducer, a control input, an output connected to said control input of said unbalanced bridge circuit of said high-frequency measuring channel, and an output connected to said control input of said unbalanced bridge circuit of said low-frequency measuring channel;

a controlled memory unit having a signal input, a control input, and an output, said signal input of said controlled



memory unit being connected to said output of said phase detector of said high-frequency measuring channel;

a controlled comparator having a first signal input, a second signal input, a control input, and an output, the first signal input of said controlled comparator being connected to said output of said controlled memory unit, said second input of said controlled comparator being connected to said output of said phase detector of said low-frequency measuring channel;

an indicator having an input connected to said output of said controlled comparator;

a control unit having three control outputs connected respectively to said control input of said controlled commutator, to said control input of said controlled comparator, and to said control input of said controlled memory unit, said control unit adapted to generate alternately signals simultaneously applied to said control input of said controlled commutator to connect said eddy current transducer into said unbalanced bridge circuit of said high-frequency measuring channel, and to said control input of said memory unit for storing the output signal of said phase detector of said high-frequency measuring channel, and signals simultaneously applied to said control input of said controlled commutator to connect said eddy current transducer into said unbalanced bridge circuit of said low-frequency measuring channel, and to said control input of said controlled comparator to compare the signal stored in said controlled memory unit with the signal of said phase detector of said low-frequency measuring channel.

4,503,393

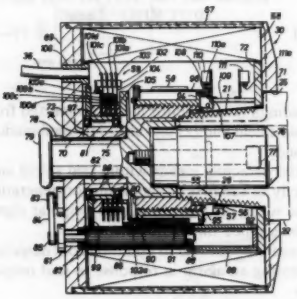
METHOD AND APPARATUS FOR DETECTING FLAWS IN THE THREADED END OF AN ELONGATE MEMBER USING ELECTROMAGNETIC EXCITATION AND AN AUTOMATED SCANNING SENSOR

Mark C. Moyer; Clifford W. Petersen, both of Missouri City; Felix N. Kusenberger, San Antonio; William D. Perry, San Antonio; Floyd A. Balter, San Antonio, and Cecil M. Teller, II, San Antonio, all of Tex., assignors to Exxon Production Research Co., Houston, Tex.

Filed Oct. 5, 1981, Ser. No. 308,749

Int. Cl.³ G01N 27/72; G01R 33/12

U.S. Cl. 324—235 **26 Claims**



1. Apparatus for detecting flaws in the threaded end of an elongate member, comprising:

an electromagnetic means for applying a magnetic force in a direction substantially parallel with the longitudinal axis of said elongate member so as to generate a magnetic field in said threaded end;

at least two axially-spaced sensing means for detecting deviations in the magnetic field from said axial direction and for generating first and second signals corresponding to said deviated magnetic field at selected axially separated positions relative to said threaded end wherein each said sensing means is radially aligned in spaced relationship with respect to the surface of the crests of the thread of said threaded end;

means for effecting relative rotational movement between said sensing means and said threaded end wherein said rotational means includes:

a first support means having a helical-shaped portion,

a second support means having said sensing means attached thereto and having a helical-shaped portion wherein said helical-shaped portion of said first support means and said helical-shaped portion of said second support means are in helical rotational engagement,

means for attaching said threaded end to said first support means, and

drive means for revolving said second support means relative to said first support means so that each said selected positions follows a helical path substantially similar to the crests of the thread of said threaded end; and

means responsive to said first and second signals for generating an output signal related to the difference between said first and second signals to provide an indication of a flaw in the threaded end.

4,503,394

MAGNETORESISTIVE SENSOR HAVING A CLOSED DOMAIN STRUCTURE AND ELECTRODE BIASING

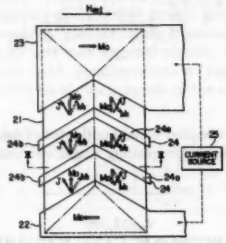
Kanji Kawakami, Katsuta; Shinji Narishige, Hitachi, and Masahide Suenaga, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 22, 1982, Ser. No. 390,882

Claims priority, application Japan, Jul. 1, 1981, 56-101183

Int. Cl.³ G01R *33/06*; G11B *5/12*; H01L *43/08*

U.S. Cl. 324—252 **13 Claims**



1. A magnetoelectric conversion element comprising:

a magnetoresistive effect material having a closed domain structure including first and second magnetic domains which are disposed in at least a part of said magnetoresistive effect material in its longitudinal direction and which have their directions of spontaneous magnetization reverse to each other in the longitudinal direction of said magnetoresistive effect material and third and fourth magnetic domains which are respectively positioned at opposite ends of said first and second magnetic domains to couple said first and second magnetic domains therethrough;

a pair of contacts for connection to a current source and formed on said magnetoresistive effect material in spaced relation from each other in the longitudinal direction of said magnetoresistive effect material; and

bias electrode means including at least one first segment disposed on said first magnetic domain to extend in a first direction inclined with respect to the longitudinal direction of said magnetoresistive effect material and at least one second segment disposed on said second magnetic domain to extend in a second direction inclined with respect to the longitudinal direction of said magnetoresistive effect material but opposite to said first direction, thereby biasing the direction of current flow through said magnetoresistive effect material between said pair of contacts with respect to the longitudinal direction of said magnetoresistive effect material.

4,503,395

METHOD AND CIRCUIT ARRANGEMENT FOR MEASURING A MAGNETIC FIELD

Wolfgang Kratzer, and Peer Thilo, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

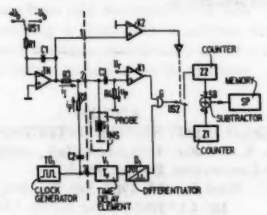
Filed May 19, 1982, Ser. No. 379,997

Claims priority, application Fed. Rep. of Germany, May 27, 1981, 3121234

Int. Cl.³ G01R *33/04*; G01C *17/28*

U.S. Cl. 324—253 **18 Claims**

6. A circuit arrangement for measuring an external magnetic field, comprising: a magnetic probe in the form of a coil with an iron core; means for applying an exciting current to the coil which increases from a negative maximum value to a positive maximum value such that the iron core reaches both a positive and a negative saturation region and which causes an inductance of the coil to change depending upon the applied exciting current, the exciting current rising discontinuously in a large plurality of relatively small steps; means for measuring voltage pulses induced at the coil as a result of and corresponding to each of the steps of the applied exciting current, the voltage pulses decaying with a different time constant depending upon a momentary coil inductance at each step; means for forming counting pulses corresponding to all of the voltage pulses whose time constants exceed a prescribed value; means for comparing a respective plurality of the counting pulses corresponding to a negative exciting current with a respective plurality of the counting pulses corresponding to a positive exciting current; and means for determining a strength of the external magnetic field in a direction of an axis of the probe from a differential magnitude derived from the comparison which is indicative of a change in an inductance curve of the coil caused by the external magnetic field.



4,503,396

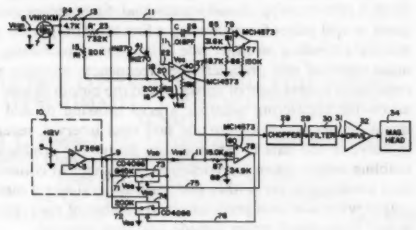
CIRCUIT AND METHOD FOR GENERATING A RAMP SIGNAL

John S. Fawkes, San Jose, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 2, 1982, Ser. No. 364,691

Int. Cl.³ G06G *7/18*; H03K *5/00, 4/08*

U.S. Cl. 328—127 **16 Claims**



1. A circuit for generating a ramp signal, comprising:

a source for providing a first D.C. reference voltage;

an integrating means having an inverting input coupled to receive a positive or negative D.C. input step voltage for responsively coupling said inverting input to said D.C. reference voltage or ground, respectively, having a noninverting input coupled to receive a predetermined ratio of said D.C. reference voltage and having an output coupled to provide said ramp signal in response to said D.C. input step voltage;

said integrating means being coupled to receive said first D.C. reference voltage and to limit a maximum value of said ramp signal provided thereby to a value determined by said D.C. reference voltage;

said integrating means having a series input resistor coupled between an input terminal for receiving said input step voltage and said inverting input and having a feedback capacitor coupled between said output and said inverting input of said integrating means and having a predeter-

mined number of further input resistors and switch means respectively, each further input resistor being coupled in parallel to said series input resistor via one said switch means; and

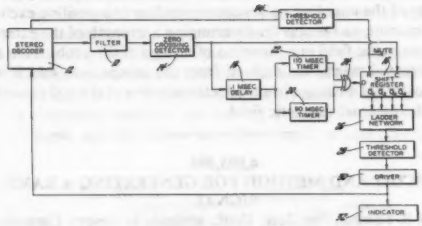
a detecting means coupled to detect in succession predetermined magnitudes of said ramp signal and to apply respective control signals in response to each said magnitude obtained by said ramp signal to activate said switch means in said succession.

4,503,397

AM STEREO PILOT SIGNAL DETECTION CIRCUITRY

Frederick K. Schultz, Bringhurst, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 17, 1982, Ser. No. 389,212
Int. Cl.³ H03K *9/02*; H03D *1/04*
U.S. Cl. 328—138 **3 Claims**



1. Circuitry for detecting an input signal of a predetermined frequency comprising input means including zero crossing detection means for producing a train of pulses corresponding to each zero crossing of said input signal, timer means synchronized to said pulses for producing a first level output for a time interval extending on either side of the next zero crossing of an input signal of said predetermined frequency, memory means responsive to said train of pulses and to the output of said timer means for registering whether a zero crossing of said input signal occurs within or outside said time interval, means responsive to the data in said memory means for producing an enabling output when a predetermined number of consecutive zero crossings occur within said time interval and a disabling output when a second predetermined number of zero crossings in said input signal occur outside said time interval.

4,503,398

AUTOMATIC GAIN CONTROL CIRCUIT

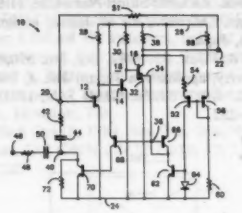
M. Faheem Akram, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 27, 1982, Ser. No. 453,330
Int. Cl.³ H03G *3/10*; H03K *23/22*
U.S. Cl. 330—285 **4 Claims**

1. An automatic gain control circuit for limiting the peaks of an input signal comprising:

a transistor for amplifying said input signal having a base coupled for receiving said input signal, a collector coupled to an output terminal, and a first emitter coupled to a supply voltage terminal;

first means coupled to a second emitter of said transistor for limiting positive peaks of said input signal, said second emitter being positively biased to collect electrons from the base which are injected from the collector when it approaches saturation; and



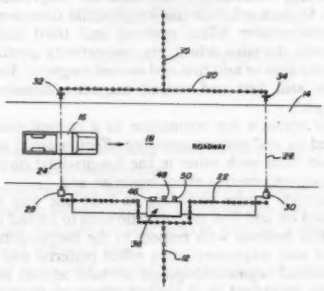
second means coupled to said collector of said transistor and said first means for limiting negative peaks of said input signal.

4,503,399

ELECTRONIC CATTLE GUARD

Jay R. Carr, Pierre, S. Dak., assignor to Keith A. Tidball, Pierre, S. Dak., a part interest

Filed Jan. 5, 1983, Ser. No. 455,894
Int. Cl.³ A01K *3/00*; G08B *21/00, 13/18*
U.S. Cl. 340—573 **11 Claims**



1. In a method of discouraging movement of livestock along a vehicle roadway, the steps of: establishing a beam of radiation across said roadway; detecting interruptions of said beam; and generating a deterrent effect in response to elapse of a predetermined delay period following detection of a first of said interruptions.

4,503,400

CIRCUIT TO MINIMIZE LOCAL CLOCK FREQUENCY DISTURBANCES WHEN PHASE LOCKING TO A REFERENCE CLOCK CIRCUIT

Ivan L. Edwards, Westmont; Robert C. McLaughlin, Bloomingdale, and Max S. Macrander, Warrenville, all of Ill., assignors to GTE Automatic Electric Inc., Northlake, Ill.

Filed Jun. 23, 1983, Ser. No. 507,427
Int. Cl.³ H03L *7/10*
U.S. Cl. 331—1 A **30 Claims**

1. A clock signal phase locking arrangement for use in a switching system which includes a source of reference clock signals, said phase locking arrangement comprising:

a control circuit operative to provide a plurality of local clock frequency control signals, said control circuit being connected to said reference clock signal source by a first connection and further operative in response to an absence of said reference clock signals, over said first con-

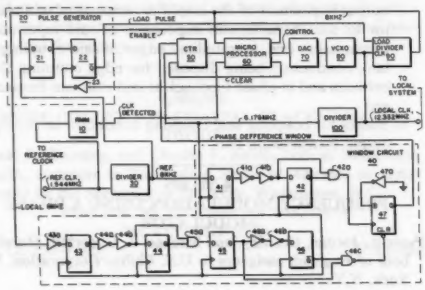
nection, for a predetermined time to maintain the local clock frequency control signal in its current state;

a local clock circuit connected to said control circuit and operative in response to said plurality of local clock frequency control signals to provide a plurality of local clock signals, each having a frequency associated with a different one of said control signals;

said control circuit being further operative in response to detection of said first connection reference clock signals after said absence to generate a synchronization signal;

a phase difference measurement circuit, connected to said reference clock signal source, by a second connection, to a first frequency divider, and to said control circuit;

said first frequency divider being connected to said local clock circuit and said control circuit, and operative in response to said synchronization signal to provide counted down local clock signals of the same frequency as



said reference clock signals, over said second connection; and

said phase difference measurement circuit being operative in response to said counted down local clock signals and said second connection reference clock signals to provide a phase difference signal representative of the phase difference between each of said counted down local clock signals and an associated one of said second connection reference clock signals;

said control circuit being further operative in response to each of said phase difference signals to provide an associated one of said control signals of a characteristic representative of the duration of said phase difference signal, whereby the frequency of said local clock circuit is adjusted to eliminate the difference in phase between said reference clock signals and said counted down local clock signals.

4,503,401

WIDEBAND PHASE LOCKED LOOP TRACKING OSCILLATOR FOR RADIO ALTIMETER

Constantinos S. Kyriakos, Deerfield Beach; Dean S. Maurer, Lighthouse Pt., and Louis J. Millio, Ft. Lauderdale, all of Fla., assignors to Allied Corporation, Morristown, N.J.

Filed Aug. 4, 1982, Ser. No. 404,946

Int. Cl.³ H03L *7/08, 7/10;* **G01S** *13/08;* **H03B** *23/00*

U.S. Cl. 331—4 **13 Claims**

1. A wideband phase locked loop tracking oscillator for use in an FM/CW radio altimeter, comprising

a phase locked loop including a voltage controlled oscillator, a phase comparator for comparing the phase of the output of said voltage controlled oscillator with the phase of an altitude signal to be tracked in frequency and an error signal amplifier for applying the output of said phase comparator to said voltage controlled oscillator to vary the frequency thereof, said voltage controlled oscillator including circuit means having an input terminal and a timing capacitor connected to said input terminal, the natural frequency of said voltage controlled oscillator being dependent upon the capacitance of said timing capacitor;

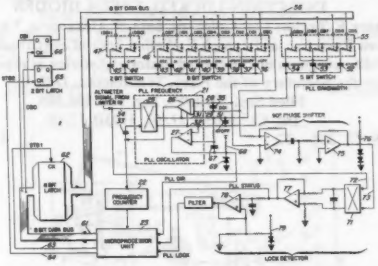
means applying an altitude signal to said phase comparator;

a microprocessor unit;

a plurality of capacitors;

digital switch means for connecting combinations of said capacitors to said input terminal of said voltage controlled oscillator to determine the natural frequency thereof; said digital switch means being responsive to digital control signal outputs from said microprocessor; and

means for detecting a phase lock condition between the output of said voltage controlled oscillator and the altitude signal applied to said phase comparator;



said microprocessor having stored therein in table form a plurality of sets of digital control signals for said switch means, each said set being adapted to determine a discrete natural frequency for said voltage controlled oscillator, said sets being arranged to provide a span of said natural frequencies covering the useful range of frequencies of said altitude signal;

said microprocessor being programmed to apply said digital control signals to said switch means set by set sequentially until said phase lock detecting means indicates the existence of said phase lock condition.

4,503,402

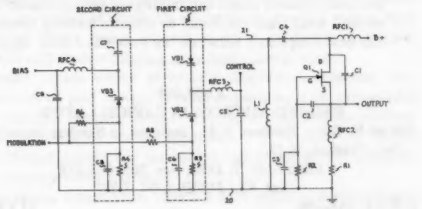
VOLTAGE CONTROLLED OSCILLATOR HAVING APPROXIMATELY CONSTANT MODULATION SENSITIVITY

Arvid E. Englund, Jr., Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed Aug. 19, 1982, Ser. No. 409,522

Int. Cl.³ H03C *3/09, 3/06, 3/20;* **H03B** *5/12*

U.S. Cl. 331—36 C **11 Claims**



1. An improved voltage controlled oscillator comprising:

a. an oscillator circuit comprising an active device coupled to a resonant circuit for producing an output having a frequency determined by said resonant circuit;

b. said resonant circuit comprising;

1. an inductor;

2. a first varactor circuit coupled in parallel with said

inductor for providing a capacity determined by a control voltage applied to said first varactor circuit;

3. a second varactor circuit coupled in parallel with said first varactor circuit and said inductor for providing a capacity determined by a modulation signal applied to said second varactor circuit;

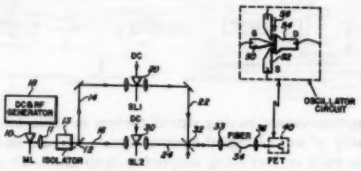
c. and circuit means coupling a selected portion of said modulation signal to said first varactor circuit for causing said first varactor circuit capacity to be additionally determined by said modulation signal.

4,503,403

OPTICAL INJECTION LOCKING OF SOLID-STATE OSCILLATORS BY FREQUENCY-MULTIPLEXED INJECTION-LOCKED, LASER DIODES

Henry F. Taylor; Lew Goldberg, both of Alexandria, Va.; Christen Rauscher, and Joseph F. Weller, both of Fort Washington, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 28, 1983, Ser. No. 536,588
Int. Cl.³ H03R *21/01*; H03B *17/00*
U.S. Cl. 331—37 **4 Claims**



1. A system for frequency and phase locking a solid state oscillator comprising:

a master laser for generating an optical output at a frequency f_o;

means for applying an RF signal at a frequency f_i to said master laser to generate optical sidebands at multiples of f_i;

a first slave laser adjusted to operate at approximately a given optical sideband of said master laser;

a second slave laser adjusted to operate at approximately a different optical sideband of said master laser than said first slave laser;

means for splitting the optical output from said master laser into at least two beams and injecting one beam into said first slave laser and injecting the other beam into said second slave laser to lock the respective slave lasers to their respective sideband frequencies in the master laser output; and

means for combining the optical output beams from said first and second slave lasers and impinging this combined beam on said solid state oscillator to effect a locking thereof to the beat frequency between the two slave laser outputs.

4,503,404

PRIMED MICROWAVE OSCILLATOR

Joseph E. Racy, Hudson, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Mar. 7, 1983, Ser. No. 473,173
Int. Cl.³ H03B *5/00, 7/00*
U.S. Cl. 331—96 **11 Claims**

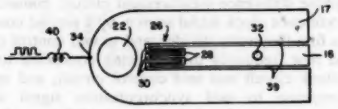
1. A primed oscillator for amplifying microwave signals that are received along an input-output transmission line and fall within a range of microwave frequencies, said oscillator comprising:

A. at least one generally planar ground-plane conductor;

B. a transistor configured for producing at an amplifier terminal thereof an amplified version of a signal appearing at a control terminal thereof;

C. a generally planar elongated tank conductor connected at one end to said control terminal of said transistor and being of such length as to support resonance of longitudinally propagating microwaves at a resonant frequency within said frequency range;

D. a generally planar elongated coupling conductor connected at one end to said amplifier terminal of said transistor, said coupling conductor being so configured in cross section and so spaced from said ground-plane conductor



as to have a characteristic impedance for matching the output impedance of the amplifier terminal of said transistor to the characteristic impedance of said input-output transmission line, longitudinal edges of said coupling and tank conductors being disposed for edge coupling therebetween and in-phase feedback at said resonant frequency; and

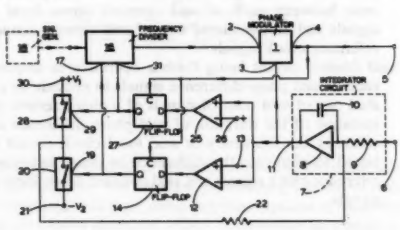
E. means for coupling said coupling conductor to the input-output transmission line.

4,503,405

FREQUENCY MODULATION USING A PHASE MODULATOR

Peter A. Jordan, Crawley, and Michael J. Underhill, Horsham, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 250,514, Apr. 2, 1981, abandoned. This application Sep. 12, 1983, Ser. No. 531,200
Claims priority, application United Kingdom, Apr. 16, 1980, 8012481
Int. Cl.³ H03C *3/08*
U.S. Cl. 332—18 **16 Claims**



1. A frequency modulator circuit arrangement comprising a phase modulator having a first input for a carrier signal, a second input for a modulation signal, and an output for the modulated carrier signal, and an integrator circuit having its output coupled to said second input of said phase modulator for providing the modulation signal, characterized in that the arrangement includes a variable-division-factor frequency divider in a signal path to the first input of the phase modulator and a control circuit for controlling the division factor of said frequency divider and for adjusting the value of the output signal of the integrator circuit, said control circuit comprising a threshold-responsive device having an input to which the output of the integrator circuit is coupled, said control circuit (a) controlling the division factor of the divider in accordance with the value of the integrator circuit output signal in such manner that said division factor will be controlled to a first value in response to the integrator circuit output signal crossing the threshold of said threshold-responsive device in a given direction and will be controlled to a second value in response to said integrator circuit output signal crossing the threshold of said threshold-responsive device in the opposite direction, and

(b) adjusting said integrator circuit output signal in said given direction by a predetermined amount, relative to the value which it would otherwise have, each time a division cycle is performed by the divider when its division factor has the second value; said first and second values of the division factor having such a relationship, and said predetermined amount of said integrator circuit output signal having such a magnitude that the change in phase of the output signal of the frequency divider/phase modulator combination, which would otherwise be produced as a result of each said division cycle being performed by said divider when the division factor has said second value after a change in said division factor from said first value to said second value, will be substantially compensated for by the change in the phase shift produced by said phase modulator occurring in response to each such adjustment of the integrator circuit output signal by said predetermined amount relative to the phase shift that the phase modulator would otherwise have produced, at least when the divider/-phase modulator combination is fed with a carrier signal having a given frequency.

4,503,406

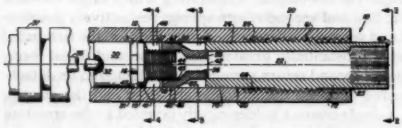
INSIDE COLLET FOR COAXIAL PLACEMENT OF DIODE

Donald R. Bowling, and Charles F. Smith, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 30, 1983, Ser. No. 510,794

Int. Cl.³ H01P *1/00*

U.S. Cl. 333—245 **7 Claims**



1. An inside collet assembly for positioning an electronic device in an elongated cavity provided by an electrically conducting body having an open end and in contact with an electrically conducting element having a face extended transversely of the cavity and disposed in an indeterminate position centrally thereof, the device having an end extended transversely of the cavity in facing relation to said face and an opposite end portion extending centrally longitudinally of the cavity and the assembly comprising:

(A) a holder which is slidably receivable in the cavity for longitudinal movement therein, the holder having a tapered exterior surface which converges in a direction from said face toward said open end when the holder is received in the cavity and defining a socket which is configured to receive said end portion of the device and opens toward said face when the holder is received in the cavity;

(B) a collet which is receivable in the cavity for movement longitudinally thereof, the collet having a tapered interior end surface which conforms to the tapered surface of the holder and is disposed for engagement therewith when the holder is received in the cavity and having a portion extending from said interior end surface oppositely of the holder toward said open end of the cavity; and

(C) means connecting the body and said portion of the collet for moving the collet toward said face with the device received in said socket so that the tapered surfaces engage moving the holder toward said face together with the device so that said end thereof is urged into electrically conductive contact with the face and the collet expands within the cavity outwardly of the tapered surfaces by wedging action therebetween into engagement with the body so as to provide electrical and thermal connection between said end portion of the device and said body.

4,503,407

DISPLAY APPARATUS INCORPORATED IN AN IMAGE-FORMING APPARATUS

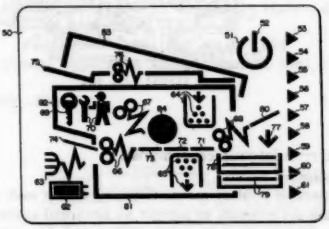
Masahiko Ogura, Fujisawa, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

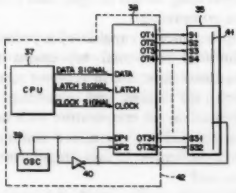
Filed Jul. 6, 1983, Ser. No. 511,195

Claims priority, application Japan, Jul. 9, 1982, 57-104114[U]; Dec. 27, 1982, 57-195352[U]

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 C **8 Claims**





1. A display apparatus incorporated in an image-forming apparatus in which images of documents are scanned by optical means and then the scanned images are formed as visible images on sheets of paper by electrophotographic means, said sheets of paper being moved along a predetermined path through said image-forming apparatus, comprising:

display means which pictorially displays component segments of said image-forming apparatus, said component segments defining at least said paper path and the outlines of said image-forming apparatus;

oscillating means for producing drive pulses and complementary drive pulses;

processing means from which a data signal is derived based upon a predetermined program, a latch signal and a clock pulse signal respectively; and

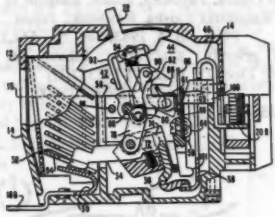
display driving means which receives said drive pulses and said complementary drive pulses so as to drive said display means under the control of said data signal, whereby said processing means controls said display means to display on said component segments a present position of sheets of paper in synchronism with the paper movement by calculating said clock pulse signal.

4,503,408

MOLDED CASE CIRCUIT BREAKER APPARATUS HAVING TRIP BAR WITH FLEXIBLE ARMATURE INTERCONNECTION

Stephen A. Mrenna, Beaver; Glenn R. Thomas, Brighton Township, Beaver County, and Charles E. Haugh, Daugherty Township, Beaver County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 10, 1982, Ser. No. 440,681
Int. Cl.³ H01H 73/48
U.S. Cl. 335—35 2 Claims



1. A circuit interrupter, comprising:

(a) enclosure means;

(b) separable contact means disposed within said enclosure means for opening to protect an electrical system;

(c) operating means disposed within said enclosure means in a state of cooperation with said contact means for causing said contact means to open; and

(d) trip means disposed within said enclosure means in a state of cooperation with said operating means for initiating said operating means to open said contact means, said trip means comprising:

(i) trip bar means capable of a predetermined amount of calibrated rotational movement in a predetermined rotational direction in reponse to thermal or magnetic stimuli for causing said initiation;

(ii) thermal means cooperative with said trip bar means for causing said predetermined amount of calibrated rotational movement in said predetermined rotational direction; and

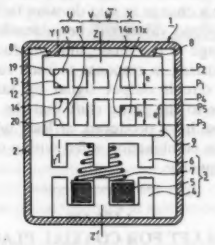
(iii) magnetic means attached to said trip bar means, said magnetic means comprising a magnetic armature which is attached to said trip bar means by a leaf spring, said magnetic means also comprising an electromagnet, an end portion of said trip bar being positioned between said leaf spring and said electromagnet, said electromagnet being spaced from said armature during non short-circuit electrical conditions in said system by a predetermined air gap distance, which distance encourages quick response to a short circuit electrical condition in said system by allowing said electromagnet to quickly pull said armature across said air gap in said predetermined direction and against said electromagnet thus rotating said armature correspondingly in said predetermined direction until said air gap is reduced to zero, said armature being rotationally moved less than said predetermined amount by said magnetic means, further rotation of said trip bar means in the same rotational direction by said thermal means to a place related to said predetermined amount of calibrated rotational movement being allowed within limits as said leaf spring flexes as said trip bar continues to rotate while said attached armature remains stationary against said electromagnet.

4,503,409

ELECTRO-MAGNETIC SWITCH DEVICE HAVING DIFFERENT OPEN OR CLOSED SWITCH CONFIGURATIONS

Gerard Lerude, Antibes, and Claude Jullien, Thenezay, both of France, assignors to La Telemecanique Electrique, France

Filed Dec. 29, 1982, Ser. No. 454,311
Claims priority, application France, Dec. 30, 1981, 81 24490
Int. Cl.³ H01H 67/02
U.S. Cl. 335—132 5 Claims



1. An electro-magnetically controlled switching assembly adaptable to form anyone of a plurality of combinations of four contact units, said combinations being of a first type comprising two normally open and two normally closed contact units, of a second type comprising one normally closed and three normally open contact units and of a third type comprising four normally open contact units, said assembly having in a case a single electro-magnet cooperating with a single movable armature; first and second return springs respectively developing first and second predetermined initial forces, the first initial force being substantially greater than the second initial force, said first and second return springs being adapted to be detachably secured between the movable armature and the electromagnet; a single contact holder rigidly coupled to the armature and presenting side by side first, second, third and fourth pairs of housings, each pair comprising a lower housing close to the armature and an upper housing more remote from the armature than the first housing, four reversible movable contact bridges respectively lodged in the respective pairs of housings, said movable contact bridges respectively receiving the action of four respective pressure springs which urge them against four respective cross bars respectively separating the upper and lower housings of the respective pairs, four reversible pairs of stationary contacts mounted in the case for respectively cooperating with the four respective movable contact bridges,

the four upper housings each having an upper application surface on an upper face of the respective cross member, which is adapted for receiving a movable contact bridge which will form, with a cooperating said pair of stationary contacts, a normally open contact unit and an opposite bearing surface which is adapted for receiving one said pressure spring and substantially parallel to said upper application surface;

the four lower housings each having, on a lower face of the respective cross member, a lower application surface which is adapted for receiving a movable contact bridge which will form, with a cooperating said pair of stationary contacts, a normally closed contact unit, and an opposite bearing surface which is adapted for receiving one said pressure spring and substantially parallel to said lower application surface;

the respective distances between the upper application surfaces and the opposite bearing surfaces of the respective upper housings of the first, second, third and fourth pairs having a first predetermined length, the distances between the lower application surfaces and the opposite bearing surfaces of the respective lower housings of the first, second and third pairs having a second predetermined

length and the distance between the lower application surface and the opposite bearing surface of the lower housing of the fourth pair having a third predetermined length which is smaller than the second predetermined length; the said four movable contact bridges being substantially identical, the said four pairs of stationary contacts being substantially identical, the said four pressure springs being substantially identical and the first return spring being used in the combinations of the first type whereas the second return spring is used in the combinations of the second and third type.

4,503,410

ELECTROMAGNETIC MINIATURE RELAY

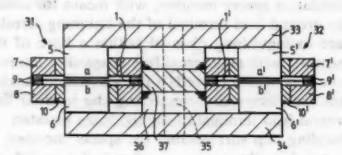
Roger M. Hochreutiner, Lieli, Switzerland, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jun. 7, 1983, Ser. No. 501,934

Claims priority, application Switzerland, Jun. 10, 1982, 3579/82

Int. Cl.³ H01H *1/66*

U.S. Cl. 335—153 **6 Claims**



1. An electromagnetic miniature relay having at least one hermetically sealed contact unit with a change-over contact, a movable contact including an elastic ferromagnetic diaphragm and fixed contacts including a pair of contact poles of ferromagnetic material mounted within spaced parallel pole rings by hermetically sealing and magnetically and electrically insulating connections, each of said contact poles extend from a different one of said pole rings toward each other and said diaphragm, said two pole rings and said diaphragm of said contact unit being connected with each other in a magnetically and electrically conducting manner and also with a coil core of a drive coil in a magnetically conducting manner, the magnetic circuit being closed via outer elements;

an outer magnetic circuit having at least one permanent magnet, the magnetic circuit of which is closed via said coil core only;

whereby the switching-over of the relay contacts is performed by producing an electromagnetic flux in said coil core with a direction opposite to that of the flux of said permanent magnet.

4,503,411

DUAL PLUNGER SOLENOID DEVICE

Warren A. Lofstrand, Enfield, Conn., assignor to Cooper Industries, Houston, Tex.

Filed Nov. 23, 1983, Ser. No. 554,638

Int. Cl.³ H01F *7/08*

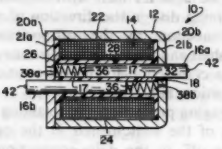
U.S. Cl. 335—259 **20 Claims**

1. A solenoid-operated plunger device comprising:

(a) a frame;

(b) a solenoid coil contained within the frame;

(c) two or more movable plungers located within the solenoid coil and projecting from the ends of the solenoid coil, the plungers being independently slidable within the solenoid coil on parallel axes;



(d) a return spring connected to each plunger for controlling the movement of the plunger; and

(e) a barrier separating the plungers.

4,503,412

STAR-DELTA-SWITCH

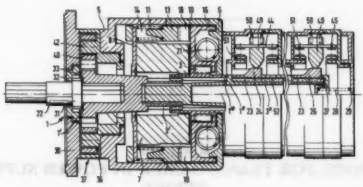
Gottfried Alsch, Vienna, Austria, assignor to Hubert Laurenz Naimer, Ascona, Switzerland

Filed Mar. 7, 1983, Ser. No. 473,044

Claims priority, application Austria, Mar. 25, 1982, 1173/82

Int. Cl.³ H01H *9/20*

U.S. Cl. 335—170 **7 Claims**



1. A star-delta switch comprising

(a) a switch-shaft rotatable about an axis thereof and having a camshaft section with contact operating cams, the switch-shaft being axially displaceable into two selected axial positions, a first one of the axial positions corresponding to a star-connection position and a second one of the axial positions corresponding to an off- and delta-connection position,

(b) spring means biasing the switch-shaft in the axial direction,

(c) circuit breaking contact means, delta-connection contact means and star-connection contact means which may be opened and closed by respective ones of the cams upon rotation of the switch-shaft in respective ones of the axial positions thereof, the circuit breaking contact means being open in the off-position and the star-connection contact means being closable before the delta-connection contact means, and

(d) a switching mechanism effective in the second axial position of the switch-shaft and including

(1) a retaining disc mounted on the switch-shaft axially spaced from the cam shaft section for rotation with the switch-shaft, the retaining disc having a projection,

(2) a spring-biased retaining pawl pivotal about a fixed axis, the projection and the retaining pawl being coplanar in the second axial position wherein the spring-biased retaining pawl is pivoted into engagement with the projection and the projection subtending the retaining pawl in the first axial position, and

(3) a fixed guideway surface inclined towards the switch-shaft axis for guiding the projection, the fixed guideway surface rising in a direction of rotation of the switch-shaft from a plane corresponding to the second axial

position thereof to a plane corresponding to the first axial position,

(4) the projection and the retaining pawl having matching oblique surfaces inclined with respect to the radius of the retaining disc in the direction of rotation from the delta-connection to the off-position whereby the switch-shaft and the retaining disc may be rotated from the delta-connection to the off-position in the second axial position, and

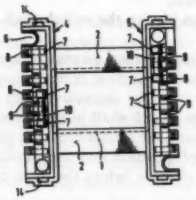
(5) the engaging projection and retaining pawl preventing rotation of the switch-shaft in the opposite direction from the off- to the delta-connection position in the second axial position of the switch-shaft while axial displacement of the switch-shaft and the retaining disc from the second to the first axial position causes the projection to subtend the retaining pawl whereby the projection is disengaged from the retaining pawl and the switch-shaft may be rotated from the off- to the delta-connection position in the first axial position of the switch-shaft, rotation of the retaining disc causing the projection to rise along the fixed guideway surface of the switching mechanism to return to the plane corresponding to the second axial position.

4,503,413

SPOOL FOR TRANSFORMER IN POWER SUPPLY DEVICE

Kurt Stalzer, Bruchköbel, Fed. Rep. of Germany, assignor to Telefonbau und Normalzeit GmbH, Frankfurt, Fed. Rep. of Germany

Filed Dec. 9, 1982, Ser. No. 448,379
Int. Cl.³ H01F *15/10, 27/30*
U.S. Cl. 336—192 **4 Claims**



1. A power supply transformer spool for carrying transformer windings comprising:

(a) a tubular bobbin with a flange (2) at an end;

(b) an attachment member (4) fixedly attached to said flange;

(c) clip means (6) coupled to said attachment member for releasably holding an inlet mains electrical cable;

(d) a series of spaced-apart elongated electrically conductive contacts (7) molded in place in said attachment member, each of said contacts having two ends for making electrical connection to the transformer or to the mains cable wires; and

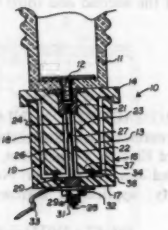
(e) non-conductive resilient arm means (9) extending out from said attachment member for releasably holding fuse means (10) electrically connected between two of said separated contacts.

4,503,414

CURRENT INTERRUPTING LIGHTNING ARRESTER ISOLATOR

Huey P. Sykes, 4213 Henning Dr., Concord, Calif. 94521, and Richard H. Brainard, 1368 Via D'Este, Livermore, Calif. 94550

Filed Jun. 20, 1983, Ser. No. 505,796
Int. Cl.³ H01H *37/36*
U.S. Cl. 337—31 **12 Claims**



1. A lightning arrester isolator, for attachment to a lightning arrester having a ground lead terminal, comprising:

an insulative spacer member, with means for connection to the ground lead terminal of the lightning arrester;

an arc extinguishing channel within a bore of the spacer member, with an internal fuse adapted to interrupt a current flow which exceeds a predetermined maximum;

means for electrically connecting the internal fuse to the ground lead terminal of the lightning arrester;

a shielding cup surrounding the spacer member, having a base below the spacer member and a peripheral flange extending upwardly from the base into proximity with the lightning arrester and spaced outwardly from the spacer member;

a fuse to the ground lead connected to the internal fuse and to the base of the shielding cup;

a base ground lead terminal on the exterior of the base, for receiving a grounded lead, and being connected to the fuse to ground lead;

releasable attachment means for normally holding the shielding cup in position surrounding the spacer member;

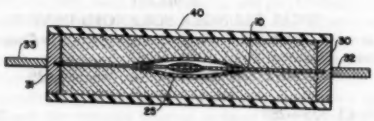
whereby, when an electrical current flows exceeding said predetermined maximum, the internal fuse melts, causing a sparking which is substantially contained by the spacer member and shielding cup, the sparking generating expansive gases which are effective to push the shielding cup and grounded lead away from the lightning arrester.

4,503,415

ENCAPSULATED HOT SPOT FUSE LINK

William J. Rooney, Clifton, and Francis J. Rooney, Ramsey, both of N.J., assignors to Commercial Enclosed Fuse Co. of NJ, North Bergen, N.J.

Filed Jun. 6, 1983, Ser. No. 501,406
Int. Cl.³ H01H *85/04*
U.S. Cl. 337—160 **12 Claims**



1. A composite fuse link assembly of the type employing a main planar link member of a conductive metal adapted to be positioned between two terminals of a fuse structure, said link having a pattern of reduced cross sectional areas along the

surface thereof, the improvement in combination therewith of an encapsulated hot spot area for said link, comprising:

a globule of a conductive metal deposited on said link member and symmetrically disposed between two adjacent reduced cross sectional areas wherein each of said reduced cross sectional area comprises a central aperture in said link with a first two-thirds circular cutout located above said aperture and with a second two-thirds circular cutout located below said aperture with said globule located on a flat portion of said link between said reduced cross sectional areas,

an insulative tubular member having first and second opened ends postioned about said globule and said link,

heat sink means for securing said tubular member at said first and second opened ends to said link at said larger areas of said link, to prevent said conductive metal of said globule from undesirably traveling down said link during fuse operation.

4,503,416

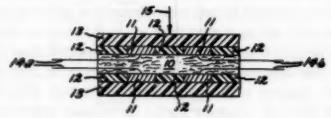
GRAPHITE FIBER TACTILE SENSOR

Wontaik Kim, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 449,346, Dec. 13, 1982, abandoned. This application Feb. 2, 1984, Ser. No. 576,289

Int. Cl.³ H01C *10/10*; H01R *11/20*

U.S. Cl. 338—99 **6 Claims**



1. A tactile sensor, especially for robot grasping manipulators, comprising:

a carbon fiber layer;

a first conductive layer disposed against a first side of said carbon layer; and

a second conductive layer disposed against a second side of said carbon fiber layer, whereby pressure applied to said sensor reduces the electrical resistance between said first and second conductive layers.

4,503,417

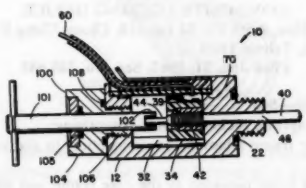
LEAK PROOF POSITION SENSOR WITH PERMANENT MAGNET SHAFT

William F. Bleeke, Vandalia, Mich., and James E. Greve, South Bend, Ind., assignors to CTS Corporation, Elkhart, Ind.

Filed Jun. 14, 1982, Ser. No. 388,124

Int. Cl.³ H01C *10/00*

U.S. Cl. 338—176 **22 Claims**



1. A leak proof transducer comprising a housing having an interior cavity, a housing opening exposing said cavity and an aperture in said housing opening into said cavity, shaft means having mating means and adjusting means, carrier means connected to said shaft means by said adjusting means, said carrier means having contactor means connected thereto, one end of said shaft means received in the aperture of said housing, means for covering said housing opening and comprising wall means having electrical circuit means disposed on one side thereof and at least one opening through said wall means, electrical connection means extending through said opening in the wall means and connected to said electrical circuit means, means for sealing said opening in the wall means and securing said electrical connection means in electrical contact with the electrical circuit means, and means for sealing said wall means onto the housing opening so that fluid will not leak from said cavity through said housing opening.

4,503,418

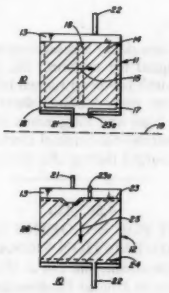
THICK FILM RESISTOR

Yakov Belopolsky, Ontario, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 7, 1983, Ser. No. 549,063

Int. Cl.³ H01C *1/012*

U.S. Cl. 338—309 **4 Claims**



1. A thick film resistor comprising:

an electrically insulating substrate having at least a first face and a second face that are approximately parallel to one another;

a first layer of resistive material deposited on said first face;

a strip of electrically conductive material located on said first face, between said substrate and said first layer, said strip oriented at approximately right angles to the current path through said first layer, said strip situated approximately midway along the current path of said first layer, and said strip being of sufficient length to intercept substantially the whole of the current path through said first layer; and

a second layer of resistive material deposited on said second face and connected in series with said first layer in such a fashion that the current path through said second layer is approximately orthogonal to the curent path through said first layer.

4,503,419

OIL LEVEL DETECTION CIRCUIT

Robert C. Kidd, Warren, Ohio, and Lawrence J. Porn, Flushing, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 17, 1983, Ser. No. 458,538

Int. Cl.³ G08B *21/00*; B60Q *1/00*

U.S. Cl. 340—59 **2 Claims**

1. Apparatus for detecting low oil level in an engine crankcase comprising:

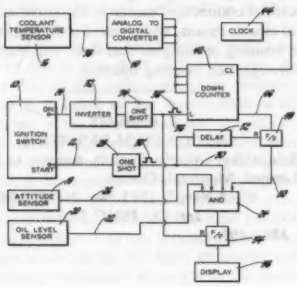
an oil level sensor for providing an oil level signal when the oil is below a given level,

an engine ignition switch,

an engine coolant temperature sensor for producing a temperature signal,

a control circuit connected to the oil level sensor and the ignition switch for generating an output immediately after the ignition switch is turned on if the oil level sensor signal is present, and

an enabling circuit in the control circuit connected to the ignition switch and to the coolant temperature sensor



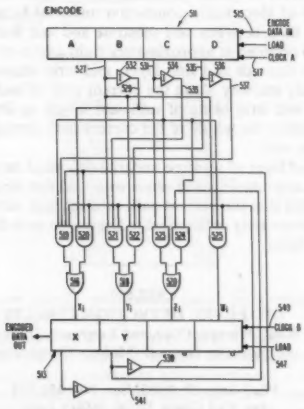
comprising a time delay circuit responsive to the coolant temperature signal for enabling the control circuit after the ignition switch has been turned off for a variable time period, the time period being short when the coolant temperature is high and long when the coolant temperature is low, whereby the control circuit is prevented from generating an output during the delay time.

4,503,420

ARRANGEMENT FOR ENCODING AND DECODING INFORMATION SIGNALS

Bernardo Rub, Marlborough, and Lih J. Weng, Lexington, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed May 7, 1982, Ser. No. 375,931
Int. Cl.³ G11B 5/09
U.S. Cl. 340—347 DD **11 Claims**



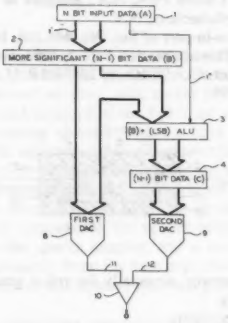
1. A circuitry arrangement for effecting an encoding operation by translating data word signals into coded word signals for use with a memory medium, communication channel and the like, comprising in combination: input means to receive data word signals; translating circuitry means coupled to said input means and formed to translate data word signals representing first and second bits into coded word signals representing first, second and third bits in such a manner that the first and second bits of said data word are respectively identical to the second and third bits of said coded word and further formed to translate data word signals representing first, second, third and fourth bits into coded word signals representing first, second, third, fourth, fifth and sixth bits in such a manner that the third and fourth bits of said data word are respectively identical to the second and sixth bits of said coded words; and output means coupled to said translating means to receive coded word signals therefrom to be transmitted to said memory medium, or the like.

4,503,421

DIGITAL TO ANALOG CONVERTER

Kyuichi Hareyama; Kenji Shiraki, and Kazuo Ryu, all of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed May 26, 1982, Ser. No. 382,189
Claims priority, application Japan, May 27, 1981, 56-80404
Int. Cl.³ H03K 13/02
U.S. Cl. 340—347 DA **9 Claims**



1. A digital-to-analog converter apparatus comprising first digital-to-analog converting means responsive to more significant bits of input digital signals for generating a first analog signal corresponding to said more significant bits of said input digital signal, arithmetic means responsive to said more significant bits and the least significant bit of said input digital signal for performing a logical addition of said more significant bits and said least significant bit, second digital-to-analog converting means responsive to an output of said arithmetic means for generating a second analog signal corresponding to said output of said arithmetic means, and summing means for summing said first and second analog signals to produce an analog output signal corresponding to said input digital signal.

4,503,422

COMPOSITE LOCKING DEVICE

Chih-Min Hsu, 2-6th Fl., 13 La. 118, Chung Ching S. Rd., Sec. 1, Taipei, Taiwan (100)

Filed Jan. 11, 1982, Ser. No. 338,685
Int. Cl.³ G08B 13/08
U.S. Cl. 340—543 **3 Claims**

1. A composite locking device comprising:

a. a case frame adapted for connection to the inside of a door;

b. a lock lever mounted in the case frame and adapted for lateral movement therein, the lock lever having a first end extendible through an opening in the case frame and a second end;

c. a first rotatable disk in the case frame adapted to receive a key for laterally moving the lock lever;

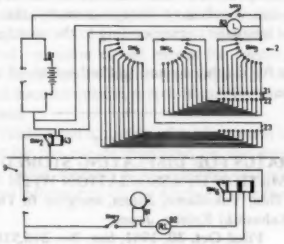
d. a lockhead having a power switch, the lockhead being adjacent to the first disk and through which the key is

adapted to be inserted to reach the disk, the power switch being activated by insertion of the key;

e. a code switch activated by the power switch;

f. an electromagnet in the case frame activated by the code switch;

g. a lock bolt movable between a first position where it engages the lock lever and a second position where it is moved off the lock lever, the lock bolt being normally in the first position and moved to the second position by the activation of the electromagnet;



h. an alarm switch which will set off an alarm, the alarm switch being activated when lateral movement of the lock lever occurs while the lock bolt is in the first position;

i. a second rotatable disk within the case frame on the side of the lock lever opposite that of the first disk and serving to laterally move the lock lever when rotated, the second disk being rotated by a lock knob on the case frame; and

j. a check piece in the case frame capable of being set to prevent lateral movement of the lock lever.

4,503,423

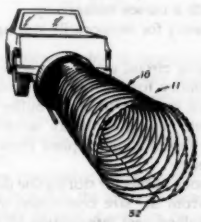
EXTENSIBLE AND RETRACTABLE BARRIER AND ELECTROMAGNETIC INTRUSION DETECTOR THEREFOR

Joseph J. Mainiero, Hauppauge, N.Y.; Michael R. Mainiero, Monroe, and Arthur T. Stanley, Shelton, both of Conn., assignors to Man Barrier Corporation, Seymour, Conn.

Filed Jan. 18, 1982, Ser. No. 340,516

Int. Cl.[3] **G08B** *13/18;* **H01P** *3/00;* **E04H** *17/04;* **B21F** *25/00*

U.S. Cl. 340—552 **36 Claims**



33. A combined physical barrier and intrusion detection system comprising a metal barrier formed of at least one substantially constant diameter helical coil extending between two locations, a microwave energy source for directing said energy along the axis of said coil, the frequency of the energy being such as to cause the energy to be guided by said coil along its axis, a receiver for transmitted microwave energy, and a detector for indicating a reduction in received energy at the receiver caused by intrusion into or disruption of the energy guided path determined by said coil.

4,503,424

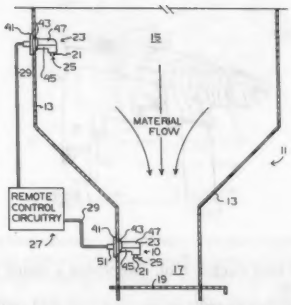
PROTECTED SENSOR FOR GRANULAR MATERIALS

David L. Evenwoll, Pinewood, Minn., assignor to Cargill, Inc., Minneapolis, Minn.

Filed Oct. 13, 1981, Ser. No. 310,436

Int. Cl.[3] **G08B** *21/00*

U.S. Cl. 340—617 **4 Claims**



1. Sensing apparatus for detecting the presence of grain at a predetermined location in a container adapted to store grain and in a conduit to contain the flow of grain from an upstream to a downstream direction, said sensing apparatus comprising:

a capacitive proximity sensor having a sensing terminal extending from the upstream direction to the downstream direction having an upstream portion and a downstream portion, said sensor adapted to exhibit a change in its capacitance as said downstream portion changes its communication from said grain;

circuit means for measuring the change in capacitance operatively associated with the capacitive proximity sensor;

a molded abrasion resistant plastic protective housing including a spacing arm substantially transverse to said sensing terminal and at least one material deflecting surface facing the upstream direction;

the upstream portion of the capacitive proximity sensor embedded in the molded protective housing and the downstream portion of said sensor extending from and outside said protective housing opposite the material deflecting surface;

said protective housing being larger and surrounding said upstream portion of said sensor, said housing allowing grain and flowing grain to be adjacent to said sensor to detect the presence of grain and flow thereof;

a mounting flange for securing the protective housing to said container, said flange and said spacing arm orienting said capacitive proximity sensor relative to the flow of grain and container so that the grain is diverted away from the downstream portion of the capacitive proximity sensor by said material deflecting surface and said container does not substantially affect the capacitance of the capacitive proximity sensor when said sensor is secured in said predetermined orientation.

4,503,425
INDICATING ARRANGEMENT FOR PORTABLE ELECTRIC DEVICES

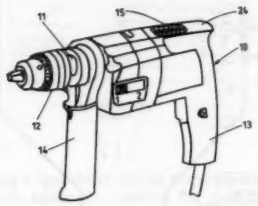
Hans Gerber, Luterbach; Ivan Hidveghy, Zuchwil, both of Switzerland; Günter Schaal, Stuttgart, Fed. Rep. of Germany; Marian Stürmer, Leinfelden, Fed. Rep. of Germany; Eberhard Vogel, Dettenhausen, Fed. Rep. of Germany, and Claude Wessel, Brügg, Switzerland, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 7, 1980, Ser. No. 166,458

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1979, 7923500[U]

Int. Cl.³ G08B *21/00*

U.S. Cl. 340—680 **5 Claims**



1. A hand-held electric tool, comprising a casing having an upper portion;

a hand grip downwardly protruding from said casing; and an indicator mounted in said upper portion and having a visual indicator portion, said casing having an upper wall, said indicator portion being postioned on said upper wall in a region thereof which is opposite to said hand grip, said indicator portion being subdivided into a plurality of sections for permitting a continuous reading of different characteristic data corresponding to the operating conditions of the tool, the sections being selectively illuminated by luminous diodes.

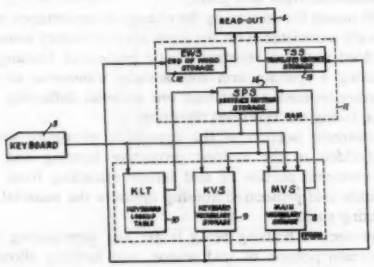
4,503,426
VISUAL COMMUNICATION DEVICE

Walter J. Mikulski, 16522 Cumberland Rd., Orange, Calif. 92665

Filed Apr. 30, 1982, Ser. No. 373,362

Int. Cl.³ G09B *3/00*

U.S. Cl. 340—711 **11 Claims**



1. A visual communication device which comprises:

a keyboard having alphabetic keys for entering multiple words in a preset syntax, one character at a time, in order to form sentences;

an addressable vocabulary storage memory for storing words in both a base language and a target language, such words being grouped at addresses within the memory according to their morphological functions;

means responsive to the actuation of said keys for addressing said vocabulary storage memory and for fetching therefrom the words and corresponding addresses which equate to the ordered combinations of characters keyed in;

a sentence pattern storage memory which is used to store the morphologically-related addresses of the base-language words, which comprise a particular sentence, in a predetermined syntactical order;

means for reordering the addresses of the the base language words selected from the keyboard in accordance in with the morphological and syntactical rules for the grammar of the target language;

a means responsive to said means for reordering, for fetching from the vocabulary storage memory, the words of the target language corresponding to the reordered addresses; and

a means for displaying and fetched words of the target language.

4,503,427
APPARATUS FOR DISPLAYING STORED PICTURE INFORMATION IN ASSOCIATION WITH A CURSOR

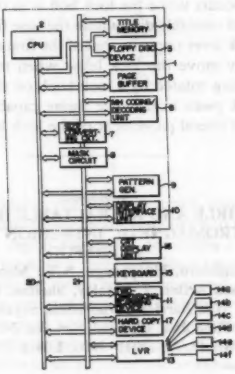
Kazuhiko Iida, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Oct. 30, 1981, Ser. No. 316,910

Claims priority, application Japan, Oct. 31, 1980, 55-153275

Int. Cl.³ G09G *1/00*

U.S. Cl. 340—731 **5 Claims**



1. Apparatus for displaying stored document information in association with a cursor comprising:

a buffer memory for temporarily storing document information;

size conversion circuit means operatively connected to said buffer memory for enlarging or reducing the document information read out from the buffer memory;

a display unit having a display screen for displaying the document information supplied from the size conversion circuit means;

refresh memory means for storing the document information obtained from the size conversion circuit for displaying the stored document information on the display unit;

means including a key input means for manually inputting cursor information for designating the position of a cursor on the display screen;

means for generating a cursor video signal for displaying a cursor on said display screen in association with the document information supplied from the buffer memory through the size conversion circuit means, said cursor video signal generating means including,

(a) first and second cursor memory means for holding X and Y direction-position information of the cursor ac-

cording to write-in code information supplied from a central processing unit;

(b) first address counter means for counting a cursor clock signal supplied from the refresh memory means;

(c) second address counter means for counting horizontal synchronizing signals supplied from the refresh memory means;

(d) first decoder means for detecting a coincidence between the content of the first cursor memory means and the content of the first address counter means;

(e) second decoder means for detecting a coincidence between the constant of the second cursor memory means and the content of the second address counter means; and

(f) logical operation circuit means for forming a cursor video signal, according to the outputs of the first and second decoder means, which is supplied to the display unit; and

means for reading out a portion of the document information enclosed by the cursor displayed on the display screen from the buffer memory so as to display said portion of the document information on the display screen in an enlarged manner.

4,503,428

RUNNING DISPLAY DEVICE IMPLEMENTED WITH A CPU

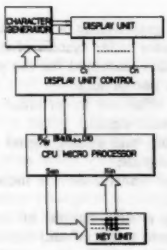
Shintaro Hashimoto, Ikoma; Yasuhiro Kotani, and Yoshiyuki Fujikawa, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 10, 1980, Ser. No. 139,124

Claims priority, application Japan, Apr. 10, 1979, 54-44051

Int. Cl.³ G09G *3/00*

U.S. Cl. 340—792 **7 Claims**



1. An electronic device capable of displaying characters or symbols on a display in a running display mode or in a static display mode, said display having a predetermined display capacity, said device comprising:

memory means for storing a certain number of said characters or symbols;

comparator means responsive to the number of said characters or symbols stored in the memory means for determining if the number of said characters or symbols exceeds said predetermined display capacity; and

control means responsive to said comparator means for initiating said running display mode by sequentially shifting said characters or symbols across said display when the number of said characters or symbols stored in said memory means exceeds said display capacity, and initiating said static display mode by producing a stationary display of said characters or symbols on said display when the number of said characters or symbols stored in said memory means does not exceed said display capacity.

4,503,429

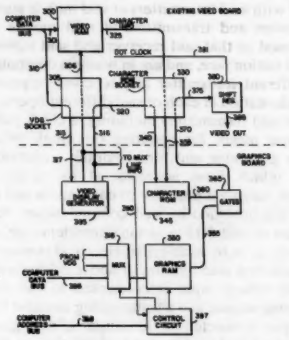
COMPUTER GRAPHICS GENERATOR

Paul T. Schreiber, Fort Worth, Tex., assignor to Tandy Corporation, Fort Worth, Tex.

Filed Jan. 15, 1982, Ser. No. 339,478

Int. Cl.³ G09G *1/02*

U.S. Cl. 340—799 **23 Claims**



1. Graphics circuitry for use in a computer system including at least one video display unit, and a central processor having means for generating peripheral address signals to select said display unit, and means for generating data signals to be displayed on said unit, said graphics circuitry comprising:

memory means responsive to memory address signals for receiving and storing data,

means responsive to selective ones of said peripheral address signals for applying a first plurality of said data signals to said graphics memory as memory address signals, and

means responsive to selective ones of said peripheral address signals for entering a second plurality of said data signals into said memory at memory locations specified by said first plurality of data signals as graphics data.

4,503,430

APPARATUS FOR TRANSMITTING SIGNALS IN A POWER DRIVEN TEXTILE MACHINE

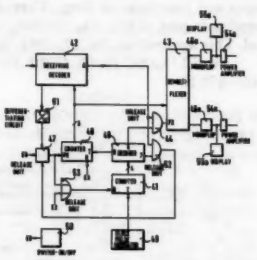
Fritz Hösel, Monchen-Gladbach, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 9, 1982, Ser. No. 396,644

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1981, 3127088

Int. Cl.³ H04Q *9/00*

U.S. Cl. 340—825.52 **17 Claims**



1. In combination with a power driven textile fiber bale opener machine including a fixed control station and a mobile station and having a movable delivery member mounted on an arm which can be rotated into different operating positions

with said delivery member and said arm being disposed at said mobile station, an apparatus for transmitting signals between said fixed station and said mobile station comprising:

a transmitter and a receiver disposed at said fixed station; a plurality of transmitters and a plurality of receivers disposed at said mobile station; said transmitter at said fixed station being associated with said receivers at said mobile station and said receiver at said fixed station being associated with said transmitters at said mobile station, with said receivers and transmitters at said mobile station being disposed so that said receiver and said transmitter of said fixed station face, and are in wireless communication with, a different transmitter and receiver respectively of said mobile station at each of said different operating positions;

each of said transmitters including: a clock pulse generator; counter means for counting the clock pulses from said pulse generator and for providing a plurality of parallel bits, which form addreses, at its output; multiplexer means, having a plurality of data inputs and responsive to said bits provided by said counter means, for selecting a certain of said data inputs in dependence on the particular address so as to establish an electrical connection between the selected said data input and a release input of a gate circuit whose input is connected to the output of said counting means; and a transmitting encoder means, having its input connected to the output of said gate circuit, for providing coded data for transmission to the associated receiver, whereby said electrical connection causes said gate circuit to release the address being provided by said counter means to said transmitting encoder means if a signal is present at the selected data input; and

each of said receivers including: a further clock pulse generator; further counter means for counting the clock pulses from said further clock pulse generator and for providing a plurality of bits, which form addresses, at its output; receiving decoder means for comparing received transmitted data, corresponding to the address of a selected input of the said multiplexer means of the associated transmitter, with the address output data provided by said further counter means and for providing an output signal when said data coincide; signal release means, connected to the output of said receiving decoder means, for providing an output signal only upon receipt of said output signal from said receiving decoder means; and a demultiplexer means, responsive to the address data from said further counter means and to said output signal from said signal release means, for providing an output signal on the one of its said data outputs corresponding to the address indicated by the concurrent address data from said further counter means.

4,503,431

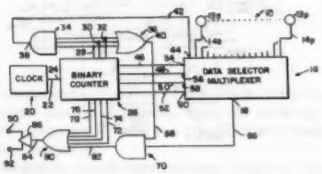
MULTIPLEX SYSTEM FOR MONITORING ENGINE STATUS

Herman P. Raab, Indianapolis, Ind., assignor to Consolidated Investments and Development Corp., Carmel, Ind.

Continuation-in-part of Ser. No. 191,840, Sep. 29, 1980, abandoned. This application Jul. 17, 1983, Ser. No. 458,447

Int. Cl.³ G08C *15/06*; G08B *19/00*

U.S. Cl. 340—870.13 **6 Claims**



1. A prime mover status data system, comprising a plurality of prime mover status sensors, a transmitter, means for coupling the sensors to the transmitter, a receiver, means for coupling the transmitter to the receiver, a utilization mechanism, and means for coupling the receiver to the utilization mechanism, wherein the transmitter and receiver are time-division multiplex devices such that the sensed data is sent in time-serial data channels from the transmitter and received and steered by the receiver to the utilization mechanism, the transmitter including means for sustaining a non-zero direct current voltage across the transmitter-receiver coupling means between data transmissions to transmit power to the receiver and utilization mechanism and means for providing zero-going data voltages across the transmitter-receiver coupling means during data transmissions, and the means for coupling the transmitter to the receiver consists essentially of two conductors, the receiver including means for sampling the received data at the geometric mean of the data channel.

4,503,432

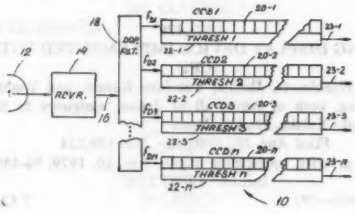
ADAPTIVE THRESHOLD DETECTION UTILIZING A TAPPED CHARGE TRANSFER DEVICE DELAY LINE

Walter H. Bailey, Johnson City, Tenn., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 17, 1981, Ser. No. 331,847

Int. Cl.³ G01S *7/30, 9/02*

U.S. Cl. 343—7 A **5 Claims**



5. Apparatus for establishing a detection threshold in a moving target indicator radar system of the type in which a received radar signal is examined for the presence of a radar return from a target, comprising:

a radar receiver effective to produce an analog signal related to said radar signal;

means for separating said analog signal into a plurality of analog doppler signals;

at least one charge transfer device including at least five storage elements;

means for feeding a first sample of one of said analog doppler signals into a first of said storage elements;

means for transferring said first sample to a second of said storage elements and for feeding a second sample of said analog doppler signal into said first of said storage elements;

means for continuing to transfer previously stored samples to elements along said charge transfer device and for feeding new samples into said first storage element, a sample in a last of said storage elements being replaced by the charge in a next to last storage element;

one of said storage elements intermediate of said charge transfer device being a target storage element whose content is examined after each transfer to determine whether it contains a sample indicative of a target;

means for summing samples in a plurality of storage elements stored before storage of a sample in said target storage element and samples in a plurality of storage elements stored after storage of said sample in said target storage element to produce a threshold signal which is responsive to an average received signal at ranges in the vicinity of a range corresponding to said sample stored in said target storage element, said means for summing including a plurality of resistors connected between respective storage elements and a common output terminal

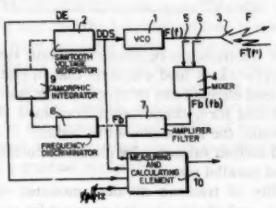
and having no connections between storage elements immediately adjacent said target storage element to said common output terminal to provide guard bands on each side of said target element; and

means for comparing said sample in said target storage element with said threshold signal to determine whether said sample in said target storage element is a target signal, said means for comparing including a first input from said common output terminal and a second input from said target storage element, said means for comparing providing an output signal when said sample signal from said target element exceeds said threshold signal.

4,503,433
RANGE MEASUREMENT BY MEANS OF FREQUENCY MODULATED CONTINUOUS WAVE RADAR

Jean P. Tomasi, Velizy, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 14, 1981, Ser. No. 330,293
Claims priority, application France, Dec. 12, 1980, 80 26438
Int. Cl.³ G01S *13/34, 13/26*
U.S. Cl. 343—7.5 **10 Claims**



1. A method for accurately determining the distance d of an object from a continuous wave FM range measuring apparatus comprising a voltage controlled oscillator (VCO) for generating a high frequency signal F having an instantaneous frequency f which is linearly modulated by means of a signal generator which applies to the VCO a sawtooth voltage signal having a ramp of duration T during which the signal F undergoes a linear frequency change of a predetermined value ΔF, an aerial for transmitting the signal F and receiving a reflection signal F' from the object, and a mixer for receiving the transmitted signal F and the received signal F' having an instantaneous frequency f', said mixer producing a signal F_b having a frequency f_b,

said method comprising the following steps during the duration T:

(a) measuring the frequency f_o of the signal F and the phase ϕ_{bo} of the signal F_b at an instant t_o;

(b) determining the integral number of N periods of the signal F_b and their total duration T_1 occurring during the duration T;

(c) calculating the approximate value of d, designated d_1, from the values of ΔF, T, N and T_1;

(d) calculating the approximate value of ϕ, designated ϕ_1, which is approximately the phase shift between the transmitted and received signals, from the values of f_o and d_1;

(e) determining the angle $2k\pi$, k being an integer, actually contained in the phase shift ϕ, from the values of ϕ_{bo} and ϕ_1;

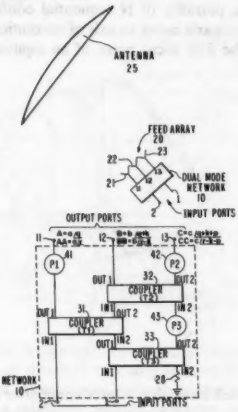
(f) determining the accurate value of ϕ, designated ϕ_2, by calculating the sum: $\phi_{bo}+2k\pi$; and

(g) calculating the accurate value of d, designated d_2, from the values of f_o and ϕ_2.

4,503,434
LOSSLESS ARBITRARY OUTPUT DUAL MODE NETWORK

Howard H. Luh, Sunnyvale, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed May 2, 1983, Ser. No. 490,927
Int. Cl.³ H01Q *3/22, 3/24, 3/26;* H01P *5/16*
U.S. Cl. 343—373 **8 Claims**



1. A substantially lossless dual mode network having first and second input ports, and first, second, and third output ports, wherein the maximum amplitudes of the voltages appearing at the three output ports are the same regardless of which input port is excited, said maximum amplitudes being denoted a, b, and c, respectively;

wherein a, b, and c are preselected and are arbitrary subject only to the constraint that the sum of the squares of any two members of the set consisting of a, b, and c must be greater than or equal to the square of the third member of said set;

said network further comprising a first coupler having a first input coupled to the second input port, and a first output coupled through a first phase shifter to the first output port;

a second coupler having a first input coupled to a second output of the first coupler, a first output coupled to the second output port, and a second output coupled through a second phase shifter to the third output port; and

a third coupler having a first input coupled to the first input port, a first output coupled to a second input of the first coupler, and a second output coupled through a third phase shifter to a second input of the second coupler.

4. The apparatus of claim 1 further comprising a feed element coupled to each of the output ports, wherein the feed elements are directed at an antenna.

4,503,435
MULTIBEAM ANTENNA ARRANGEMENT WITH MINIMAL ASTIGMATISM AND COMA

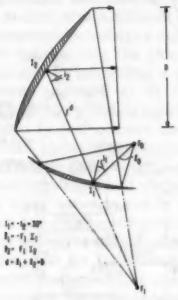
Corrado Dragone, Little Silver, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 352,389, Feb. 25, 1982, abandoned. This application Jun. 16, 1983, Ser. No. 505,100
Int. Cl.³ H01Q *19/19*
U.S. Cl. 343—781 P **3 Claims**

1. A multibeam antenna arrangement with minimal aberrations due to astigmatism and coma, comprising: a plurality of N sequentially confocal reflectors including N+1 separate focal points comprising at least a curved focusing offset main reflector capable of bidirectionally reflecting a beam of radiated electromagnetic energy between the N^{th} and the N+1 focal

points along a feed axis thereof, and a subreflector disposed along the feed axis of the main reflector comprising a curved reflecting surface capable of bidirectionally reflecting said beam between said N^{th} and an N−1 points of the N+1 separate focal points; and

at least one feedhorn disposed at or in the vicinity of a first focal point of said N+1 focal points and oriented with a longitudinal axis thereof coincident with an equivalent axis of the plurality of N sequential confocal reflectors, the equivlent axis being an axis of revolution which passes through the first focal point of an equivalent reflecting



surface which is capable of producing after a single reflection the same field distribution over the reflected wavefront as that of the plurality of N sequential confocal reflectors

characterized in that

the reflecting surface of each of two of the plurality of N sequential confocal reflectors are deformed with a separate deformation coefficient, C_n specifying the displacement, Z_n, of each associated reflecting surface in the Z^{th} direction according to the relationship

$$Z_n = C_n P_n$$

where P_n is the distance from the Z axis at a focal point of the reflector, and the deformation coefficient for each of the two reflecting surfaces is specified by the relationship

$$-l_{2n2-1}\, C_{n2} \cos^{2i_{n2}} = (l^4_{2n1-1} \frac{C_{n1} \cos^{2i_{n1}}}{(M_{n1+1} \cdots M_{n2})^4} =$$

$$\frac{2^5 (M-1)}{(M_1 \ldots M_{n2})^2 \sum_{s=0}^{n_2-n_1-1} \frac{l_{2(n1+s}+l_{2(n1+s-1)}}{l_{2(n1+s)} l_{2(n1+s-1)}} (M_{n1+s+1} \ldots M_{n2})^2}$$

where the magnification of any reflector

$$M_n = \frac{l_{2n-2}}{l_{2n-1}}$$

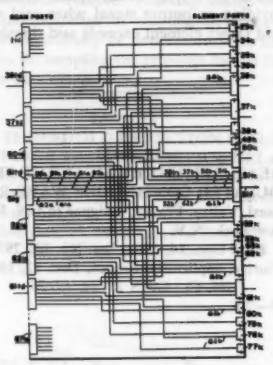
with l_{2n-1} and l_{2n-2} being the distances along the feed axis of the antenna arrangement to a central point on the reflector from the focal point of the reflector nearest and furthest, respectively, from the first focal point of the antenna arrangement; n_1 and n_2 designate the number of the nearest and furthest reflector, respectively, along the feed axis from the first focal point of the antenna arrangement to be deformed; i is the angle of incidence of a ray propagating between the two focal points of a reflector which impinges the central point of the reflector n; $(M_{n1+1} \cdots M_{n2})$ represents the product of the magnifications of the reflectors n_1+1 to and including reflector n_2; M is the total magnification of the antenna arrangement; and $(M_1 \ldots M_{n2})$ is the product of the magnifications of the first reflector up to and including the n_2 reflector of the antenna arrangement.

4,503,436

BEAM FORMING NETWORK

Paul W. Cramer, Jr., San Gabriel, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 10, 1982, Ser. No. 448,441
Int. Cl.³ H01Q *3/24*
U.S. Cl. 343—876 **7 Claims**



1. In an electromagnetic communication system which includes a network of feed elements that operate in groups so that each feed element can receive separate portions of a transmit signal and form therefrom a combined electromagnetic transmit beam, the improvement including:

first and second substantially planar circuits lying in closely spaced parallel planes;

a plurality of transmit dividers mounted on said second circuit, each divider having an input for receiving a transmit signal and a plurality of output lines;

a plurality of transmit combiners mounted on a first circuit, each combiner having a plurality of input lines, so that each combiner can receive a portion of several signals from several corresponding divider output lines, each combiner having an output coupled to one of said feed elements;

a plurality of the output lines of each divider extending in the plane of the second circuit, each output line extending at least one-fourth of the distance towards the lateral position of a transmit combiner and having an output line end;

a plurality of the input lines of each combiner extending in the plane of the first circuit, each input line extending at least one-fourth of the distance towards the lateral position of a divider and having an output line end lying at the same lateral position as a corresponding divider output line end; and

a plurality of interboard connectors, each extending perpendicular to the planes of said circuits and each connecting the end of a divider output line to the end of the combiner input line that lies at the same lateral position.

4,503,437

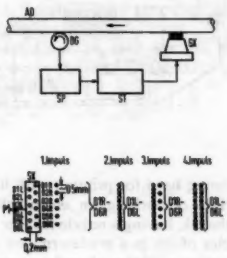
INK JET COLOR-CODING METHOD FOR LEADS

Wolfgang Katzschner, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Aug. 24, 1982, Ser. No. 411,016
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1981, 3142374
Int. Cl.³ G01D *15/18, 15/16*; B41F *17/00*
U.S. Cl. 346—1.1 **8 Claims**

1. Method for labelling a moving lead by forming imprints, particularly a light waveguide fiber, by means of an ink printer

by means of which color spots from a plurality of nozzles in at least two rows and aligned to extend transversely of the direction of movement of said lead are simultaneously ejected onto said lead, whereby said nozzles are separately controllable such that said at least two rows of nozzles produce color spots which are applied in successive work steps, and gaps between said spots are closed by means of longitudinal movement of said leads which has ensued between said work steps and said color spots at least partially overlap, characterized in that the individual nozzles of said two rows of nozzles are offset transversely of each other relative to the direction of movement of said lead and rows of color spots are applied parallel to the feed direction of said lead and the longitudinal feed is selected such that, beginning from the outer region of the color application, a gradual decrease in the width of the gaps between said color spots is achieved and at least two color spots are applied on top of one another in the middle region of the imprint being formed, whereby the cross-sectional profile of the color application is designed with a gradual rise up to a maximum value and, following a gradual decrease.

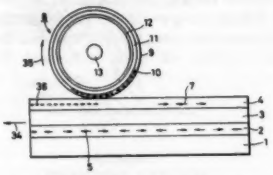


4,503,438

METHOD OF ERASING MAGNETIC LATENT IMAGE IN THERMO-MAGNETIC RECORDING

Koichi Saitoh; Teruhiko Itami, and Toshifumi Kimoto, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Aug. 25, 1982, Ser. No. 411,187
Int. Cl.³ G01D *15/12*
U.S. Cl. 346—74.4 **11 Claims**



1. A method of erasing a magnetic latent image from a thermally magnetized layer of a recording medium having a further magnetized layer storing a magnetization pattern, said method comprising the steps of:

applying a magnetic field to said thermally magnetized layer; and

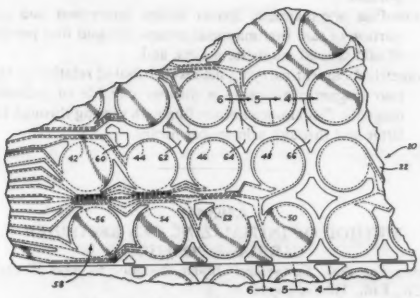
simultaneously applying heat to said medium, at least a component of said magnetic field being produced from said magnetization pattern of said further magnetic layer.

4,503,439

THIN-FILM, COMPLIANT, NON-PRESSURE-POINT-TELEGRAPHING, ELECTROMAGNETIC READ/WRITE HEAD STRUCTURE

Gilbert D. Springer, 549 Torland Ct., Sunnyvale, Calif. 94087

Filed Mar. 8, 1983, Ser. No. 472,866
Int. Cl.³ G01D *15/12*
U.S. Cl. 346—74.5 **4 Claims**



1. A thin-film, floppy and compliant, electromagnetic read/write head array structure specially adapted for expanse-type, pressure-biased, substantially uniform-pressure contact with a facial zone in a relatively moving magnetic imaging medium, said structure comprising

a thin-film, flexible web having opposed faces, with one including a defined expanse constructed for direct contact, over the area of said expanse, with such a zone,

means distributed over the other face in said web in the form, generally, of plural projecting spaced land portions which cooperate with said web to form plural electromagnetic imaging heads arranged in a predetermined array substantially spanning another defined expanse on said other face which other expanse is substantially co-extensive with said first-mentioned expanse, and

point-pressure-minimizing means also distributed over said other face in the form, generally, of plural projecting spaced land portions located in, and appreciably filling, selected spatial regions existing between said first-mentioned land portions,

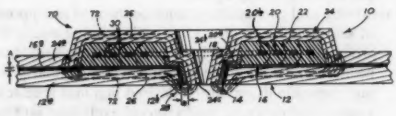
all of said land portions having substantially the same elevation relative to said other face, and said second-mentioned land portions cooperating with said first-mentioned land portions to minimize the likelihood, at any location in said co-extensive expanses, of preferential point-pressure telegraphing through said structure to a recording medium during compliant pressure-biased contact with such a medium.

4,503,440

THIN-FILM MAGNETIC WRITING HEAD WITH ANTI-SATURATION BACK-GAP LAYER

Gilbert D. Springer, 48571 Milmont Dr., Fremont, Calif. 94538

Filed Mar. 8, 1983, Ser. No. 473,361
Int. Cl.³ G01D *15/12*
U.S. Cl. 346—74.5 **6 Claims**



1. Apparatus for producing a magnetic image in a magnetic-image storage medium comprising

first magnetic pole means defining a generally thin-film sheet-like magnetic web including one web surface defining a pole face and having one portion spaced from said one surface,

second magnetic pole means disposed on one side of said web including a first surface adjacent and magnetically spaced from said one surface defining a second pole face and including a first portion disposed adjacent said one portion,

thin-film non-magnetic spacer means interposed said one portion of said first magnetic means and said first portion of said second magnetic means, and

electrical current-carrying means distributed relative to said two magnetic means in a manner capable of inducing magnetic flux along a known flux path passing through the latter and through said spacer means.

4,503,441

METHOD OF INITIALIZING PEN RECORDER CARRIAGE POSITION

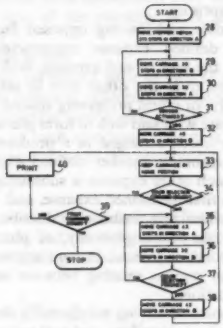
Tadao Tamukai, Tamayama, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed May 5, 1983, Ser. No. 491,934

Claims priority, application Japan, May 6, 1982, 57-74507[U]

Int. Cl.³ G01D *9/00, 9/36, 15/16*

U.S. Cl. 346—139 R **3 Claims**



1. A method of driving a pen recorder including a carriage supporting a rotatable drum with a plurality of pen units mounted thereon and a stepper motor for driving the carriage across a sheet of print paper through a print region in which the pen units can effect printing and a nonprint region in which the pen units can effect no printing, said method comprising the steps of:

moving said carriage to a stopper position at an end of said nonprint region by rotating said stepper motor through a predetermined number of increments, thereby establishing a fixed relationship between the phase of said stepper motor and the position of said carriage;

moving said carriage through said print region to allow a selected pen unit to effect printing on the sheet of print paper in a printing cycle;

returning said carriage to a home position at an opposite end of said nonprint region after each printing cycle; and

reprocating said carriage in an interval between said stopper position and said home position while angularly moving said rotatable drum until a desired pen unit is selected for a next printing cycle, said interval excluding said stopper position, so that said home position can be fixed with respect to said stopper position until all desired printing cycles are performed.

4,503,442

INK JET PRINTING HEAD AND SERIAL PRINTER

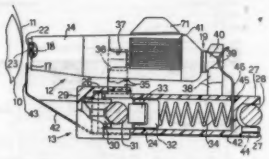
Aquilino Barbero, Pavone Canavese, and Roberto Realis Luc, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Dec. 23, 1982, Ser. No. 452,845

Claims priority, application Italy, Dec. 23, 1981, 68664 A/81

Int. Cl.³ G01D *15/16*

U.S. Cl. 346—140 R **18 Claims**



1. An ink jet printing head for printing with liquid, electrically conductive ink, comprising an electrically insulating container (**14**) for the ink, having a nozzle (**18**) for the selective discharge of particles of ink in a predetermined direction, an electrode (**19**) in contact with the ink and a counter-electrode (**22**) adjacent to the nozzle, the discharge of ink being caused by an electrical voltage pulse between the counter-electrode and the electrode, characterised in that the container (**14**) is formed of a rigid body closed by an end wall (**49**) adjacent said nozzle and perpendicular to said direction, and comprises a first capillary passage (**50**) located on said body in a plane perpendicular to said direction between the nozzle (**18**) and said end wall, and a second capillary passage (**51**) on the lowest part of said end wall to convey said ink into said first passage, thus for permitting the formation of a meniscus (**23**) of ink in the nozzle (**18**) until the ink in the container is exhausted.

4,503,443

SERIAL INK JET PRINTING HEAD

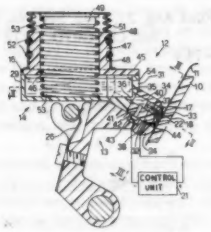
Gian D. Dagna, Ivrea, and Mario Buat, Carema, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Dec. 23, 1982, Ser. No. 452,846

Claims priority, application Italy, Dec. 23, 1981, 68663 A/81

Int. Cl.³ G01D *15/16*

U.S. Cl. 346—140 R **13 Claims**



1. A serial ink jet printing head for liquid electrically conductive ink, comprising an electrically insulating container (**14**) for the ink (**16**), having a nozzle (**18**) for the selective discharge of particles of ink, an electrode (**41**;**91**) in contact with the ink and a counter-electrode (**22**) adjacent the nozzle, the discharge being caused by an electrical voltage pulse between the counter-electrode and the electrode, an insulating plate (**17**) carrying said nozzle (**18**) and closing said container (**14**) toward the printing support, a first cavity (**33**;**71**) disposed between said plate (**17**) and a surface (**34**) parallel thereto and having a thickness which is of the same order of magnitude as the plate,

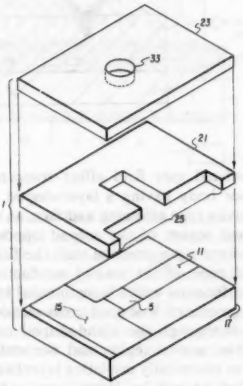
a second cavity (35;72) including a flexible diaphragm (51;83) whereby its volume can be expanded upon bubble formation in the ink during operation, and passage means (37, 38, 39; 73, 74, 75) between said first cavity and said second cavity across said surface (34).

4,503,444

METHOD AND APPARATUS FOR GENERATING A GRAY SCALE WITH A HIGH SPEED THERMAL INK JET PRINTER

Christopher A. Tacklind, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 29, 1983, Ser. No. 490,003
Int. Cl.³ G01D *15/18*
U.S. Cl. 346—140 R **16 Claims**



1. A driver for applying a train of current pulse packets to a thermal ink jet printer, comprising:

a controller for issuing a control signal;

first generation means, coupled to the controller, for generating control pulses at a predetermined rate, for receiving the control signal, and for generating control pulses having widths determined from the control signal; and,

second generation means, coupled to the first generation means at an input and to the thermal ink jet printer at an output, for receiving the control pulses and for presenting packets of current pulses at the output, said packets of current pulses having a preselected pulse repetition rate greater than the reciprocal of a droplet break-off interval of the thermal ink jet printer, a pulse packet rate determined from the control pulse rate, and a number of pulses per packet determined from the width of the control pulse.

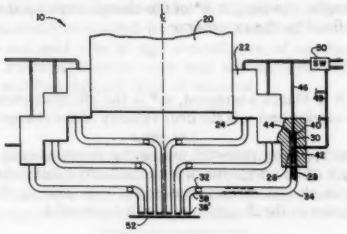
4,503,445

PRINTING SYSTEM

Robert Fridman, 6502 Park Heights Ave., Baltimore, Md. 21215

Filed Aug. 19, 1983, Ser. No. 524,530
Int. Cl.³ G01D *15/24*
U.S. Cl. 346—141 **11 Claims**

1. In a system for printing on a surface marks formed by a DOT system having a plurality of chambers with fluid therein, marking means associated with said chambers, means providing for spark-induced pressure increase in the fluid in said chambers selectively for causing motion making said marking means mark a said surface element, the improvement comprising: each said chamber having an angled configuration, and said spark-induced pressure increase caused motion including



motion in a direction towards straightening said angled configuration.

4,503,446

HEAT-SENSITIVE COLOR-DEVELOPING COMPOSITION

Masakichi Yahagi, Tokyo; Kimiaki Kinoshita, Kitamoto, and Masashi Enokiya, Tokyo, all of Japan, assignors to Shin Nisso Kako Co., Ltd., Japan

Filed Dec. 3, 1982, Ser. No. 446,520
Claims priority, application Japan, Dec. 9, 1981, 56-196967
Int. Cl.³ B41M *5/18*
U.S. Cl. 346—209 **16 Claims**

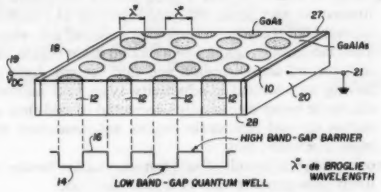
1. A heat-sensitive, color developable recording material which carries, on a substrate, a heat-sensitive layer of a composition which comprises a color-developing dye being normally colorless or pale in color, an organic acidic substance capable of causing said color-developing dye to form a color on heating, and a sensitizer selected from the group consisting of dibenzyl terephthalate and dibenzyl isophthalate.

4,503,447

MULTI-DIMENSIONAL QUANTUM WELL DEVICE

Gerald J. Iafrate, Toms River; Thomas A. Aucoin, Ocean, both of N.J., and David K. Ferry, Ft. Collins, Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 16, 1982, Ser. No. 398,740
Int. Cl.³ H01L *29/161, 29/78, 27/12, 23/48*
U.S. Cl. 357—16 **23 Claims**



1. A semiconductor device formed from first and second type of semiconductive material exhibiting predetermined energy gaps between their conductive and valance bands and wherein said first type of semiconductive material further exhibits a relatively low charge carrier mobility at high band gap and wherein said second type of semiconductive material exhibits relatively high charge carrier mobility at low band gap and comprising,

a thin uniform planar layer of said first type of semiconductive material having opposite ends,

a plurality of multi-dimensional charge carrier confinement regions of said second type of semiconductive material

laterally disposed within said layer of said first type semiconductive material and wherein said confinement regions have respective sizes and mutual separations between adjacent regions substantially equal to or less than the de Broglie wavelength λ^* of the charge carrier and which is defined by the expression:

$$\lambda^* = h/m^* v_t$$

where h is Planck's constant, m^* is the effective mass of the charge carrier, and v_t is the drift velocity of the charge carrier, and

means applying potential across the opposite ends of said layer of said first type of semiconductive material causing rapid charge carrier transfer between said confinement regions in the direction of applied potential.

4,503,448

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE WITH A HIGH TOLERANCE AGAINST ABNORMALLY HIGH INPUT VOLTAGE

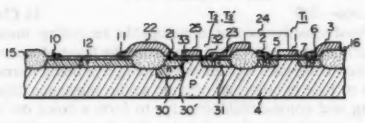
Kiyoshi Miyasaka, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 278,713, Jun. 29, 1981,. This application Jun. 28, 1984, Ser. No. 625,195

Claims priority, application Japan, Jul. 1, 1980, 55-89482

Int. Cl.³ H01L *29/78, 29/90, 27/02, 49/00*

U.S. Cl. 357—23.13 **7 Claims**



1. A semiconductor integrated device having a high tolerance against abnormally high input voltages, comprising:

a semiconductor substrate having a first conductivity type;

an input electrode formed on said semiconductor substrate;

an input stage of said semiconductor integrated device formed on said semiconductor substrate and including a first MIS transistor comprising a gate insulator layer, a first gate electrode, and a first source region and a first drain region each having a second conductivity type being the opposite of said first conductivity type, said first source region or said first drain region being electrically connected to said input electrode;

an internal circuit of said semiconductor integrated device formed on said semiconductor substrate and including a second MIS transistor comprising a second gate electrode, a second source region, and a second drain region, each of said second source region and said second drain region having said second conductivity type, said second gate electrode being electrically connected to said first source region or said first drain region not connected to said input electrode; and

another internal circuit of said semiconductor device operatively connected to said first gate electrode;

said first source region or said first drain region connected to said input electrode has a depth greater than the depth of said second source or drain region, has a depth greater than said first source region or said first drain region not connected to said input electrode, and has an impurity concentration varying in a first direction perpendicular to the surface of said semiconductor substrate from a first concentration at the surface of said semiconductor substrate to a second concentration lower than said first concentration and at respective levels along said first direction being substantially uniform throughout said first source or drain region in a direction parallel to the surface to the surface of said semiconductor substrate, whereby said first gate insulation layer is prevented from destruction due to said abnormally high input voltages applied to said input electrode.

4,503,449

V-MOS FIELD EFFECT TRANSISTOR

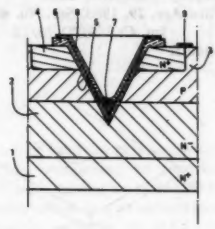
Gerard R. David, Cambes en Plaine; Jean-Claude Vallee, Herouville Saint Clair, and Jacky Caret, Caen, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 10, 1982, Ser. No. 416,725

Claims priority, application France, Sep. 14, 1981, 81 17320

Int. Cl.³ H01L *29/78, 29/08*

U.S. Cl. 357—23.4 **9 Claims**



1. An insulated gate field effect transistor comprising a semiconductor body having a layer-shaped first region of a first conductivity type adjoining a surface, an underlying layer-shaped second region of the second opposite conductivity type, which form a p-n junction with the first region, and an island-shaped zone of the second conductivity type which adjoins the surface and which is surrounded by the first region, at least one groove of V-shaped cross-section in the surface, which extends through the island-shaped zone and the first region into the second region and the walls of which are coated with an electrically insulating layer, a conductive layer being provided on said insulating layer and forming a gate electrode of the field effect transistor, the island-shaped zone and the second region being provided with source and drain electrodes, characterized in that an electrically insulating filler material different from that of said electrically insulating layer is provided in the lower part of the groove between the gate electrode and the bottom of the groove.

4,503,450

ACCUMULATION MODE BULK CHANNEL CHARGE-COUPLED DEVICES

Robert J. Brewer, Lyndhurst, England, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 535,538, Sep. 23, 1983, abandoned, which is a continuation of Ser. No. 286,944, Jul. 27, 1981, abandoned, which is a continuation of Ser. No. 120,970, Feb. 13, 1980, abandoned. This application Apr. 25, 1984, Ser. No. 603,981

Claims priority, application United Kingdom, Feb. 19, 1979, 7905716

Int. Cl.³ H01L *29/78, 27/14, 31/00;* **G11C** *19/28*

U.S. Cl. 357—24 **5 Claims**

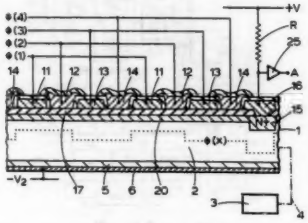
1. An accumulation-mode bulk channel charge-coupled device for continuously converting an electromagnetic radiation pattern in a certain wavelength range into an electrical signal, which comprises:

a semiconductor body having a radiation-sensitive region for detecting radiation in said wavelength range of a first conductivity type determined by a dopant having at least one energy level sufficiently deep in the semiconductor band gap such that substantially all of the atoms of said dopant are un-ionized at the temperature of operation of the device, substantially all first-conductivity-type impurities present in said region being un-ionized at said temperature, said region being subtantially free of majority

charge carriers in the absence of said radiation and majority charge carriers trapped by said dopant atoms being released upon excitation by incident radiation in said wavelength range;

a first ohmic contact to said region for supplying majority charge carriers to said dopant to replace charge carriers released by the incident radiation;

an electrode system adjacent a first major side of the region for permitting electric fields to be capacitively generated in the region for accumulating the released majority carriers below the electrode system as charge packets corresponding to the incident radiation pattern and for transporting said charge packets laterally across the region to an output connection from the region;



a surface layer of said first conductivity type at said first major side of said region below the electrode system which comprises a conductivity-type-determining dopant having at least one energy level sufficiently shallow in the semiconductor band gap such that at the temperature of operation of the device atoms of this shallow-level dopant are ionized, said surface layer adjoining said region and being separated from the first ohmic contact by a part of said region; and

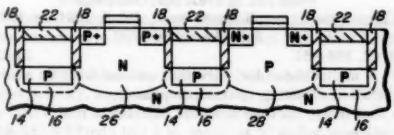
a second ohmic contact which is electrically connected to said surface layer for extracting the majority charge carriers generated by the shallow-level dopant to form a space-charge zone in said surface layer which forms a potential minimum in said body which is spaced from the surface so as to permit said charge packets to be accumulated and transported at a distance below the surface of the body.

4,503,451

LOW RESISTANCE BURIED POWER BUS FOR INTEGRATED CIRCUITS

Clarence A. Lund, Phoenix, and Michael D. Sugino, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 30, 1982, Ser. No. 404,264
Int. Cl.³ H01L *23/52, 27/04*
U.S. Cl. 357—50 **7 Claims**



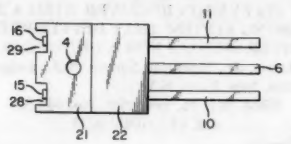
1. An integrated circuit structure including a low resistance buried power bus comprising: a semiconductor substrate of a first conductivity type having first and second surfaces and defining in said first surface a channel having a bottom and sides; a first diffused layer including material of a second conductivity type diffused in said bottom of said channel; said sides of said channel being treated to form a layer of insulating material therealong between said substrate and said channel; a second layer of metal deposited in said channel in contact with said first diffused layer and insulated from said substrate by said layer of insulating material; and tubs of said first and said second types of conductivity formed in said substrate adjacent said channel with said tubs of said first type of conductivity being electrically contacted from said second surface of said substrate and said tubs of said second type of conductivity being in electrical contact with said second layer of metal through said first diffused layer of material.

4,503,452

PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICE AND METHOD FOR MANUFACTURING THE SAME

Masami Yokozawa, Kyoto, and Isao Kanai, Shiga, both of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed May 14, 1982, Ser. No. 378,435
Claims priority, application Japan, May 18, 1981, 56-75444
Int. Cl.³ H01L *21/58, 21/56, 23/34, 23/00*
U.S. Cl. 357—72 **4 Claims**



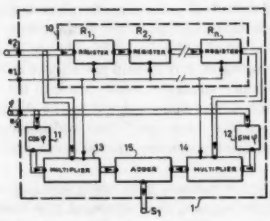
1. A plastic encapsulated semiconductor device comprising a semiconductor device on a support substrate embedded in a plastic encapsulating housing having a top surface, bottom surface and side surfaces, external leads, connected to said semiconductor device, extending from a side surface of said housing, a notched portion on a side surface opposite to the side surface from which said external leads extend, said substrate support having strips connected thereto which extend to said side having the notched portion, said strips being cut off within said notched portion to prevent electrical contact with said strips.

4,503,453

DIGITAL METHOD AND DEVICE FOR CORRECTING THE PHASE ERROR OF A SAMPLED SIGNAL AS APPLICABLE TO THE CORRECTION OF TELEVISION SIGNALS

Daniel Rougeolle, and Pascal Porrot, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jul. 19, 1982, Ser. No. 399,871
Claims priority, application France, Jul. 24, 1981, 81 14422
Int. Cl.³ H04N *9/32*
U.S. Cl. 358—13 **16 Claims**



1. A digital method for correcting the phase error with respect to a predetermined reference value at the time of analog-to-digital conversion of a sine-wave signal having a predetermined frequency F to a sequence of first representative digital signals, said conversion being performed by sampling

the analog signal by means of a periodic clock signal having a frequency equal to 4nF, where n is a whole number greater than or equal to 1, wherein said method comprises the following steps:

measurement of the phase-shift angle between the analog signal and the clock signal and computation of the phase error in respect of each period of said analog signal;

creation of a second sequence of digital signals by a displacement in time of said first digital signals, said displacement being equal to n periods of the periodic clock signal;

generation of a digital signal representing the value of the cosine and sine functions of the phase error;

multiplication of the first and second digital signals by the digital signals representing respectively the values of the cosine and sine functions of said phase error;

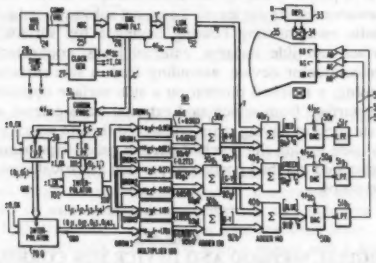
and addition of the results of said multiplications in order to generate a third digital signal, said third signal being equal to the first corrected signal of said phase error.

4,503,454

COLOR TELEVISION RECEIVER WITH A DIGITAL PROCESSING SYSTEM THAT DEVELOPS DIGITAL DRIVER SIGNALS FOR A PICTURE TUBE

Henry G. Lewis, Jr., Hamilton Square, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 26, 1982, Ser. No. 444,521
Int. Cl.³ H04N 9/32
U.S. Cl. 358—13 **35 Claims**



1. In a color television display apparatus, a digital signal processing system for developing from a digitally supplied information signal a plurality of analog drive signals for an image display device, said system comprising:

means for providing binary coded digital samples containing color picture information;

a digital processor operating on said digital samples for developing a first set of a plurality of binary coded digital signals containing color and luminance information derived from said color picture information;

a digital-to-analog converter arrangement responsive to a second set of a plurality of binary coded digital signals for developing therefrom said plurality of analog drive signals to produce an image display, each of the digital signals of the second set being related to the digital signals of the first set by a set of coefficient multipliers that produce an image display containing said color picture information; and

a plurality of memory units being supplied with said first set of digital signals, each arranged as a look-up table multiplier for multiplying the binary coded digital signals of said first set by the appropriate multipliers of said set of coefficient multipliers; and

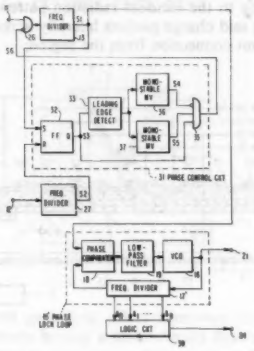
means for summing the products generated by said plurality of memory units to develop said second set of digital signals from said first set of digital signals.

4,503,455

CONTROL SIGNAL GENERATOR FOR A TELEVISION SIGNAL CODEC

Toshio Oshima, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1983, Ser. No. 464,257
Claims priority, application Japan, Feb. 9, 1982, 57-19121; Feb. 9, 1982, 57-19122
Int. Cl.³ H04N 9/46, 5/04
U.S. Cl. 358—19 **5 Claims**



1. A control signal generator for producing a control signal in phase synchronism with a synchronization signal preselected from a horizontal and a vertical synchronizing signal of a television signal and comprising:

first frequency dividing means for controllably frequency dividing a subcarrier signal of said television signal to produce a first frequency divided signal;

second frequency dividing means for frequency dividing said synchronization signal to produce a second frequency divided signal;

phase control means coupled to said first frequency dividing means and responsive to said first and said second frequency divided signals for phase controlling said first frequency divided signal so as to keep a phase difference which said first frequency divided signal has relative to said second frequency divided signal, within a prescribed tolerance; and

control signal producing means responsive to said first frequency divided signal for producing said control signal.

4,503,456

AUTOMATIC REGISTRATION ADJUSTING SYSTEM

Takashi Nakamura, Atsugi; Kazunori Yamaji, Habano, and Taku Kihara, Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 2, 1982, Ser. No. 394,770
Claims priority, application Japan, Jul. 8, 1981, 56-106380
Int. Cl.³ H04N 9/09
U.S. Cl. 358—51 **21 Claims**

1. A multi-tube color television camera with an automatic registration adjusting system comprising:

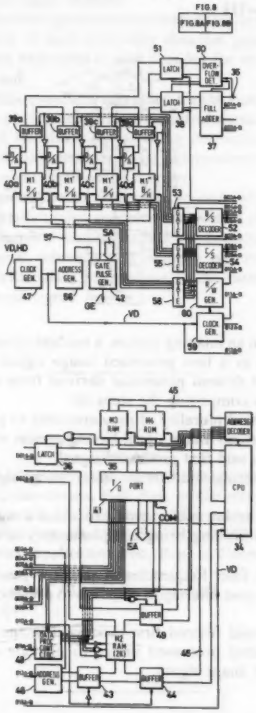
a first image pick-up tube for deriving a first video signal corresponding to an image of a test chart for registration adjustment;

a second image pick-up tube for deriving a second video signal corresponding to said image of said test chart and having a deflection control circuit;

error sampling means for sampling registration errors between said first and second video signals at portions thereof corresponding to an array of segmented areas of said image;

interpolated registration error generating means for generat-

ing interpolated registration errors at portions of said video signals intermediate said sampled registration errors in the absence of sampled data at said intermediate portions by interpolating between the sampled registration errors at least in the vertical direction of said array of segmented image areas;



means for generating registration compensating signals based on said interpolated and sampled registration errors; and

means for supplying said registration compensating signals to said deflection control circuit of said second image pick-up tube for correcting registration errors of the latter in respect to said first image pick-up tube.

4,503,457

TINT LAYING DEVICE FOR USE IN A PICTURE REPRODUCING MACHINE

Kunio Ikuta, Nagaokakyo, and Hitomi Atoji, Kyoto, both of Japan, assignors to Dainippon Screen Seizo Kabushiki Kaisha, Japan

Filed Mar. 30, 1981, Ser. No. 248,896
Claims priority, application Japan, Apr. 3, 1980, 55-43913
Int. Cl.³ H04N *1/46*
U.S. Cl. 358—75 **4 Claims**

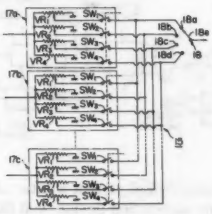
1. A tint laying device for use in a picture reproducing machine, comprising:

(a) a pickup head which scanns an original picture and picks up a picture signal;

(b) a color discriminator which receives the picture signal output from the pickup head, and discriminates a color in hue of the picture signal to output a discrimination signal;

(c) a halftone dot area rate controller which receives the discrimination signal fed from the color discriminator, and outputs a signal corresponding to a halftone dot area rate predetermined of a halftone dot to be recorded, per each color;

(d) an exposure amount controller which varies the halftone dot area rate of the halftone dot depending on the signal output from the halftone dot area rate controller; and



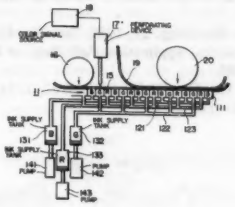
(e) an exposure head which scanns a recording film and records a reproduction picture thereon according to the halftone dot area rate in synchronization with the pickup head.

4,503,458

COLOR HARDCOPY APPARATUS

Kouichi Karaki, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 23, 1982, Ser. No. 421,920
Claims priority, application Japan, Sep. 25, 1981, 56-151617
Int. Cl.³ H04N *1/46*
U.S. Cl. 358—75 **11 Claims**



1. A color apparatus comprising a color ink vessel in which plural sets of three primary color ink cells are arranged along two dimensions and at a pitch corresponding to that of color signals and cells being arranged to hold color inks and having upper surfaces, means to feed a copy film in close contact with the surfaces of said color ink cells, means placed above and facing said color ink cells to make perforations corresponding to the color signals and representing an original picture in the copy film, and means to supply a sheet of copy paper over the copy film and to copy the original picture on the copy paper through the perforations formed in the copy film.

4,503,459

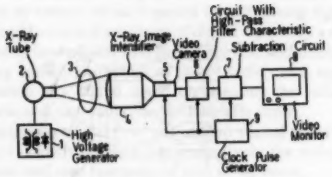
X-RAY DIAGNOSTIC INSTALLATION FOR PROVIDING SUBTRACTION IMAGES

Joerg Haendle, Erlangen, and Wolfgang Maass, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 22, 1982, Ser. No. 421,286
Claims priority, application Fed. Rep. of Germany, Dec. 14, 1981, 3149483
Int. Cl.³ H04N *5/32*
U.S. Cl. 358—111 **5 Claims**

1. An X-ray diagnostic installation comprising an image

intensifier television chain, a subtraction circuit having at least one image memory and a difference stage for providing subtraction images through difference formation from the stored video signals and chronologically displaced video signals, and



a monitor, characterized in that a filter circuit is series connected with the subtraction device, said filter circuit having a high-pass filter characteristic for the purpose of two-dimensional spatial frequency filtering.

4,503,460

X-RAY DIAGNOSTIC INSTALLATION COMPRISING AN IMAGE INTENSIFIER TELEVISION CHAIN

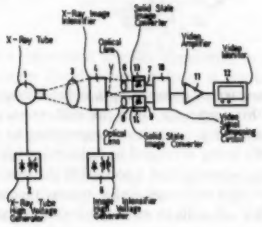
Hartmut Sklebitz, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 29, 1982, Ser. No. 426,736

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1982, 3207085

Int. Cl.³ H04N *5/32, 3/12, 3/14, 5/30*

U.S. Cl. 358—111 **2 Claims**



1. An X-ray diagnostic installation comprising an image intensifier television chain which includes an X-ray image intensifier having an output fluorescent screen, an optical coupling means, a video pickup device comprising optoelectronic solid state image converter means, and a monitor, the solid state image converter means being comprised of n semiconductor image sensors each of which comprises a matrix of sensor elements, the optical coupling means comprising n lenses aligned with the image intensifier so that respective regions of the output fluorescent screen of the X-ray image intensifier are imaged on the respective image sensors, and so that the entire output fluorescent screen is scanned, and a composing circuit connected between the image sensors and the monitor and composing the output signals of the image sensors into a video signal which is displayed on the monitor.

4,503,461

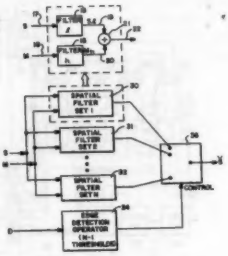
MULTIPLE MEASUREMENT NOISE REDUCING SYSTEM USING SPACE-VARIANT FILTERS

Dwight G. Nishimura, Palo Alto, Calif., assignor to The Board of Trustees of the Leland, Stanford Junior University, Palo Alto, Calif.

Filed Feb. 22, 1983, Ser. No. 468,657

Int. Cl.³ H04N *5/32, 1/40*

U.S. Cl. 358—111 **13 Claims**



1. For use in an imaging system, a method of reducing extraneous signals in a first processed image signal of an object representing a desired parameter derived from a plurality of measurements comprising the steps of:

processing said plurality of measurements to provide a second processed image signal having greater signal-to-noise ratio than said first processed signal,

low pass filtering said first processed image signal to reduce its noise,

high pass filtering said second processed image signal, said high pass filtering being complementary to said low pass filtering;

varying the filter frequencies of said low pass filtering and said high pass filtering in response to presence of artifacts, and

combining said filtered first processed image and said filtered second processed image to provide an improved processed image signal.

4,503,462

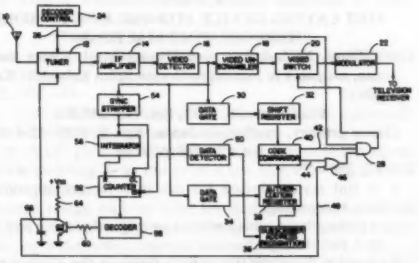
AUTOMATIC HOMING SYSTEM FOR A SUBSCRIPTION TELEVISION SIGNAL DECODER

Gordon E. Kelly, Algonquin; Richard G. Merrell, Hebron, and Mutsuo Nakanishi, Glen Ellyn, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Oct. 16, 1981, Ser. No. 312,040

Int. Cl.³ H04N *7/16;* **H04K** *1/04*

U.S. Cl. 358—122 **10 Claims**



1. An automatic homing system for a television signal decoder, said television signal decoder including a memory adapted for storing subscriber data transmitted during selected horizontal lines of the vertical intervals of each of a plurality of

scrambled television signals broadcast over a plurality of respective television channels, comprising:

control means selectively operable for establishing a decoder on-mode signal representing that said decoder is in use or a decoder off-mode signal representing that said decoder is not in use;

tuning means responsive to said on-mode signal for tuning a selected television channel;

subscriber data recognition means responsive to the information content of said subscriber data for presenting subscriber data addressed to said decoder for storage in said memory; and

subscriber data presence detecting means coupled to said tuning means for developing a control signal in response to a tuned television signal being characterized by the presence of said subscriber data independent of the information content represented thereby;

said tuning means being responsive to said off-mode signal for sequentially tuning successive television channels until a channel is tuned which results in the development of said control signal, whereby said memory may be updated by said subscriber data in response to the establishment of said off-mode signal.

4,503,463

IMAGE REPRODUCING APPARATUS

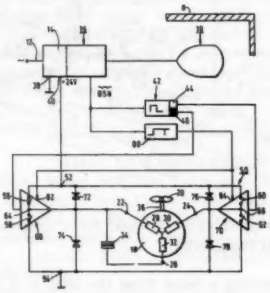
Theo Nüsse, Willebadessen, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 430,170

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1982, 3227850

Int. Cl.³ H04N *5/04, 5/64*

U.S. Cl. 358—148 **18 Claims**



1. In an image reproducing apparatus comprising:

a picture tube (**10**) within a housing;

a control circuit (**16**) controlling the beam deflection of said picture tube and generating an image synchronization signal (BSN) having a predetermined image producing frequency which is preferably almost equal to a mains frequency;

and a ventilator (**20**) arranged within said housing and driven by an electrical motor (**18**);

the improvement consisting in that the motor (**18**) is a rotating-field motor;

and that the rotating field of said motor is generated constantly and sybchronously to the image synchronization signal (BSN) and in dependency on the latter.

4,503,464

GAMMA CORRECTION CIRCUIT FOR TELEVISION

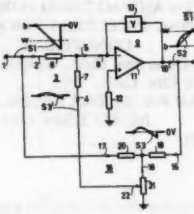
Pieter B. Dielhof, Breda, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 14, 1983, Ser. No. 458,121

Claims priority, application Netherlands, Feb. 19, 1982, 8200667

Int. Cl.³ H04N *5/20*

U.S. Cl. 358—164 **2 Claims**



1. A gamma correction circuit for television, comprising a gamma corrector which has an input for receiving the signal to be gamma-corrected and an output for supplying a gamma-corrected signal, this output being connected to an input of a first superposition stage a further input of which is coupled to an input terminal of the gamma correction circuit, the first superposition stage having an output for supplying a difference signal which corresponds to the gamma correction, the output of the first superposition stage being connected to an input of a second superposition stage, the gamma correction circuit having an output terminal for supplying a gamma-corrected signal, characterized in that the second superposition stage has an other input which is connected to the input terminal of the gamma correction circuit and an output connected to the input of the gamma corrector for producing a signal which is formed with inverted gamma, the output of the gamma corrector being connected to the output terminal of the gamma correction circuit.

4,503,465

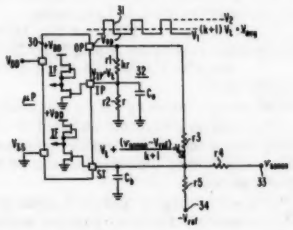
ANALOG SIGNAL COMPARATOR USING DIGITAL CIRCUITRY

Charles M. Wine, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 24, 1982, Ser. No. 444,165

Int. Cl.³ H03K *5/153;* **H04N** *5/50;* **H04B** *1/16*

U.S. Cl. 358—195.1 **13 Claims**



1. An arrangement for developing at a first input port of a digital controller a voltage that is representative of the logic threshold voltage level exhibited by the digital circuitry employed by said controller for switching from one logical switching state to another logical switching state, said arrangement conprising a first input port and an output port of said digital controller, each port assuming logical switching states,

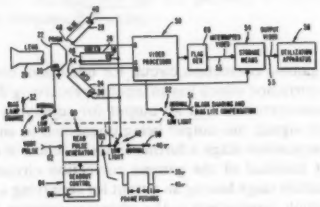
means for developing at said input port a voltage representative of the voltage being developed at said output port and a logic network coupled to said first input port and to said output port for testing the logical switching state of the input port and based upon such testing switching the state of the output port to the state that is opposite that of the input port in a manner that results in said representative voltage being representative of said logic threshold voltage level.

4,503,466

APPARATUS AND METHOD FOR GENERATING OPTIMIZING PICTURES UNDER LOW LIGHT CONDITIONS

John O. Ryan, Cupertino, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Feb. 23, 1982, Ser. No. 351,399
Int. Cl.³ H04N *5/34*
U.S. Cl. 358—211 **8 Claims**



1. System for increasing the effective sensitivity of an image tube during its readout scanning process, including means for inhibiting the image tube's readout scanning process for a selected plurality of inhibited scan periods of a given repeating cycle of scan periods, and for enabling the image tube's readout scanning process for a selected enabled scan period to generate a corresponding image tube output signal, comprising:

recorder means including a videotape recorder for storing the output signal as successive pictures during the enabled scan period; and

means integral with the videotape recorder for reproducing each successive picture in a still frame mode of operation during respective inhibited scan periods following each enabled scan period.

4,503,467

ANALOG-DIGITAL CONVERTING APPARATUS

Masatoshi Ida, Hachioji; Kenichi Oinoue, Tokyo; Masahiro Aoki, Fussa, and Asao Hayashi, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Mar. 24, 1982, Ser. No. 361,436
Claims priority, application Japan, Mar. 28, 1981, 56-46093
Int. Cl.³ H04N *3/12*; G06K *9/38*
U.S. Cl. 358—212 **22 Claims**

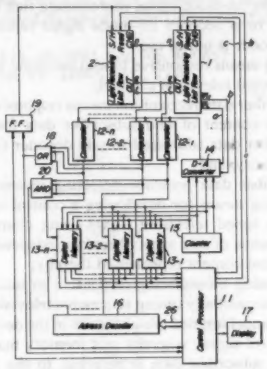
1. A method for converting analog output signals of a plurality of light receiving elements included in a photo-electric converting device into digital signals comprising:

sampling and holding the output signals of the light receiving elements;

comparing each sampled and held signal in a comparator with an analog reference signal the amplitude of which varies successively in step-shaped fashion between lower and upper limit values, said lower and upper limit values defining a dynamic range of analog-digital conversion;

supplying a digital signal to memories associated with each of the comparators, said digital signal having a value which varies successively in correspondence with said analog reference signal;

storing in said memories the instantaneous values of the digital signal when the comparator associated with that memory changes its state; and



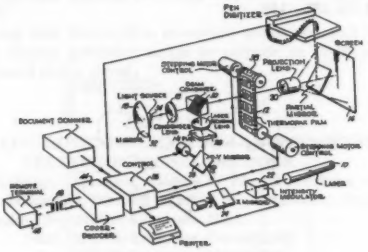
establishing said lower limit value of said dynamic range by supplying the output from a light receiving element having a light shielding mask applied thereon as the lower limit value of said dynamic range.

4,503,468

INTERACTIVE VIEWGRAPH SYSTEM

Nur M. Serinken, Kanata; Iain D. Calder, Nepean; James Gale, Kanata, and Norman C. Fletcher, Almonte, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Oct. 9, 1981, Ser. No. 309,977
Int. Cl.³ H04N *1/22*
U.S. Cl. 358—256 **12 Claims**



1. A receiver-transmitter terminal for a communications link, the terminal comprising:

a laser;

means for directing a beam from the laser at a thermally sensitive film to thermally generate a hard copy image on the film in response to a data stream;

projecting means for projecting light through said film simultaneously with generation of the hard copy image thereby to generate a further enlarged image at a viewing screen;

a first data input port for data entry to said data stream from a similar remote terminal;

local data generating means;

a second data input port for data entry to said data stream from the local data generating means; and

a data output port for sending data generated at said local data generating means to the remote terminal whereby the hard copy image can be generated and amended in real time by both a local participant accessing said data stream

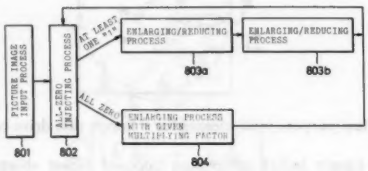
using said local data generating means and by a remote participant accessing the data stream using a data generating means at said similar remote terminal.

4,503,469

PICTURE IMAGE ENLARGING/REDUCING SYSTEM

Hiroshi Kato, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1983, Ser. No. 459,078
Claims priority, application Japan, Jan. 26, 1982, 57-9599
Int. Cl.³ H04N *1/04, 1/46*
U.S. Cl. 358—287 **8 Claims**



1. A picture image magnification system for magnifying (i.e. enlarging or reducing), by a desired magnifying factor, an original picture image comprising a plurality of picture elements arrayed in n rows of at least m elements each, where m and n are positive integers, said system having means for generating a plurality of signals corresponding to said picture elements with each signal having a plurality of possible values including a zero value, said system further comprising:

judging means for monitoring said signals and providing an all-zero detection output when a predetermined number of consecutive ones of said signals all have zero values; and

processing means for, in the absence of said all-zero detection output, enlarging by a first magnifying factor a portion of said original picture image represented by said predetermined number of consecutive signals and subsequently reducing said portion by a second magnifying factor different from said first magnifying factor in order to obtain a copy image corresponding to said original picture image magnified by said desired magnifying factor, said processing means in response to said all-zero detection output magnifying said portion of said original picture image directly by said desired magnifying factor.

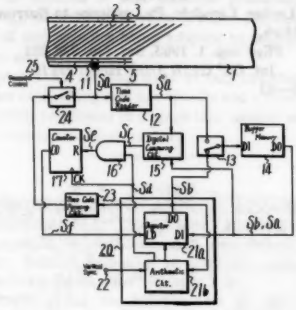
4,503,470

TIME CODE GENERATOR

Michio Mita, Atsugi, and Jun Takayama, Machida, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 20, 1982, Ser. No. 341,105
Claims priority, application Japan, Jan. 22, 1981, 56-8206
Int. Cl.³ H04N *5/782;* **G11B** *27/00*
U.S. Cl. 360—33.1 **4 Claims**

1. A time code generator for a tape recorder comprising time code generating means for generating a first time code signal incrementally in response to a synchronizing signal, a time code reader for reading a second time code signal reproduced from a tape recorder, comparator means connected to said generating means and to said reader for comparing said first time code signal with said second time code signal to produce an output signal representing an inconformity between said first and second time code signals, counting means connected to said comparator means and to said time code generating means for counting increments of said first time code signal in response to an output signal from said comparator means, and means connected to said counter and operative in response thereto for changing the output of said time code generating means to correspond to said second time code signal in response to an output of said counting means, whereby said first time code signal is periodically made equal to said second time code signal and maintained in synchronism with said second



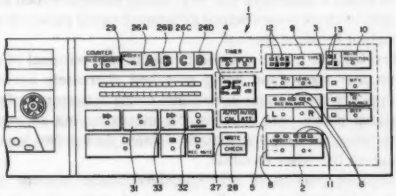
time code signal during periods between outputs of said counting means.

4,503,471

CONTROL ARRANGEMENT FOR ELECTRONIC APPLIANCE

Mitsuru Hanajima, Hoya; Yoshinori Yamamoto, and Yasushi Matsumoto, both of Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 24, 1982, Ser. No. 422,567
Claims priority, application Japan, Oct. 8, 1981, 56-160478
Int. Cl.³ G11B *27/24*
U.S. Cl. 360—69 **11 Claims**



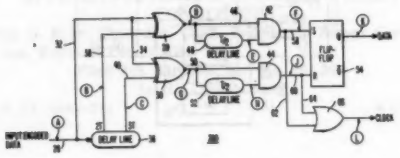
1. In an electronic appliance of the type in which a plurality of elements are selectively controlled in response to setting information, and including a control panel having setting means on which said setting information is entered, latch means for receiving said setting information from said setting means and setting each of said elements into a setting state as established by said setting information entered on said setting means, and display means mounted on said control panel and coupled to said setting means and operative to display said setting information; the improvement comprising a read switch; a write switch; memory means operative to receive and store the setting information contained in said latch means upon actuation of said write switch and to cause said latch means to receive and store the setting information contained in said memory means upon actuation of said read switch after operation of said write switch; check switch means coupled to said memory means for causing the contents of the latter to be selectively displayed on said display means; and setting-change display means ssociated with said display means and said setting means for indicating that the setting information for at least one of said element has been altered by an entry of new setting information on said setting means after said setting information has been read out from said memory means and received in said latch means.

4,503,472

BIPOLAR TIME MODULATED ENCODER/DECODER SYSTEM

William A. Lacher, Lansdale, Pa., assignor to Burroughs Corp., Detroit, Mich.

Filed Sep. 1, 1983, Ser. No. 528,581
Int. Cl.[3] G11B 5/09; H04L 27/10
U.S. Cl. 360—43 10 Claims



1. An encoder/decoder system for encoding an NRZ data stream of two unipolar voltage levels to bipolar time-modulated data pulses and for decoding the latter comprising:

an encoder portion of said encoder/decoder system, said encoder portion including programmable counter means having a plurality of input terminals and an output terminal, a source of clock pulses, means for applying said NRZ data and said clock pulses respectively to a first and a second of said plurality of input terminals, said voltage levels of said NRZ data conditioning said counter means to count a respective pair of different predetermined numbers of clock pulses before generating signal pulses on said output terminal thereof,

a first bistable means coupled to said output terminal of said counter means and being switched alternately between opposite stable states in response to the occurrence of said signal pulses, said first bistable means having an output terminal, said bipolar time-modulated data pulses appearing on the latter terminal,

a decoder portion of said encoder/decoder system, said decoder portion including a pair of comparator means each having a pair of input terminals and an output terminal, delay means having an input terminal and a pair of output terminals,

means coupling the output terminal of said first bistable means in common to an input terminal of each of said pair of comparator means and to said input terminal of said delay means, the pair of output terminals of said delay means being coupled respectively to the other input terminals of each of said comparator means, the delay in said data pulses provided by said delay means between said input terminal and said pair of output terminals thereof corresponding respectively to the time intervals for counting said pair of different predetermined numbers of clock pulses,

each of sad comparator means generating a pulse on said output terminal thereof in response to the concurrence of data signals on its respective input terminals,

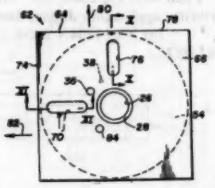
a second bistable means having set and reset terminals and an output terminal, means coupling the respective output terminals of said comparator means to said set and reset terminals, the signals appearing on the output terminal of said second bistable means in response to the setting and resetting thereof representing decoded data, and logic means coupled to said set and reset terminals for generating clock-type pulses in concurrence with said decoded data.

4,503,473

DUAL PURPOSE HEAD CLEANER

Stanley Eyler, Tarzana, and Timothy Hume, Simi Valley, both of Calif., assignors to Head Computer Products, Inc., Tarzana, Calif.

Filed Mar. 15, 1983, Ser. No. 475,454
Int. Cl.[3] G11B 5/41
U.S. Cl. 360—128 5 Claims



1. A dual-purpose head cleaner for a floppy disc drive comprising:

(a) a square jacket comprising opposed jacket sheets of resiliently flexible material;,

(b) a cleaning disc of resiliently flexible abrasive material adapted to clean but not damage a disc drive head, said disc being adapted to be rotated within said jacket, said disc having a central opening adapted to receive a drive hub of the disc drive;

(c) said jacket having openings therein disposed as follows when said jacket is operably inserted within a disc drive;

centrally aligned openings through both of said jacket sheets to provide access of the drive hub of the disc drive to said cleaning disc;

a pair of opposed openings through both jacket sheets aligned to provide access therethrough to said cleaning disc for two opposed heads when said jacket is inserted in the disc drive in a first orientation; and,

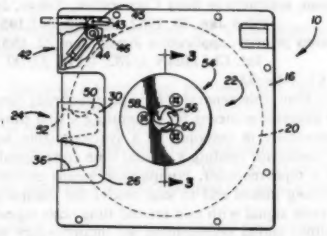
a single opening through only one jacket sheet aligned to provide access therethrough to said cleaning disc for one head when said jacket is inserted in the disc drive in a second orientation.

4,503,474

DISC DRIVE CARTRIDGE ARRANGEMENT

Anil Nigam, Cupertino, Calif., assignor to SyQuest Technology, Fremont, Calif.

Filed Jun. 4, 1982, Ser. No. 384,927
Int. Cl.[3] G11B 23/02, 5/82, 5/012, 5/52
U.S. Cl. 360—133 15 Claims



1. A cartridge with a data storage disc comprising:

a housing;

a hub means for rotatably mounting the disc to the housing;

said hub means including a self-centering hub clamp having at least two inwardly extending and flexible fingers, said fingers being substantially disposed in a plane which is substantially perpendicular to an axis of said hub, and said

fingers being flexibly displaceable in said plane so that said fingers are displaceable perpendicularly to said axis of said hub; and

door and aperture means for allowing access through said housing to said disc.

4,503,475

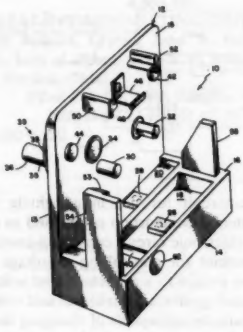
TAPE CLEANER

Gardner L. Hall, P.O. Box 216, Plymouth, N.H. 03264

Filed Sep. 8, 1982, Ser. No. 415,802

Int. Cl.³ G11B *15/00*; B08B *11/02*

U.S. Cl. 360—137 **10 Claims**



1. Apparatus for cleaning magnetic tapes in dual reel or continuous loop cassettes comprising:

a platform adapted to be horizontally positioned;

a wall extending upwardly, away from one end of said platform;

a first means for receiving in said wall a first tape cleaning pad to engage exposed portions of tape in cassettes, said first pad-receiving means being spaced above said platform;

a second means for receiving in said wall a second tape cleaning pad to engage exposed portions of tape in cassettes, said second pad-receiving means being spaced above said first pad receiving means;

a first set of cassette-holding members extending upwardly, away from said platform and spaced from said wall, said first set of members being adapted to position and hold a first, dual reel, cassette in an operative position above said platform with its exposed tape portion positioned for contact with said first pad, a pair of said members of said first set being spaced apart in positions for supporting the rear portion of said dual reel cassette;

a second set of cassette-holding members, extending upwardly, away from said platform and spaced further from said wall than said first set of members, said second set of members being adapted to position and hold a second, continuous loop, cassette in an operative position spaced above said dual reel cassette with its exposed tape portion positioned for contact with said second pad, each of said members of said second set being spaced from said wall a distance greater than the distance said dual reel cassette extends from said wall when said dual reel cassette is in its said operative position and less than the distance said continuous loop cassette extends from said wall when said continuous loop cassette is in its said operative position, the members of said second set being spaced apart a distance less than the distance between the sides of said continuous loop cassette, said members of said first set extending upwardly, away from said platform a distance less than the spacing between said platform and the continuous loop cassette when it is in its said operative position, said members of said second set extending upwardly from said platform a distance greater than the distance said dual reel cassette extends above said platform in its operative position;

a pair of spindles in said platform positioned to project through the hubs of the reels of a dual reel cassette, at least one of said spindles being adapted to engage one of said hubs; and

drive means for driving tapes in said cassettes, said drive means comprising said one spindle and a roller mounted in said wall positioned to engage tape against an idler roll in said continuous loop cassette.

4,503,476

MAGNETIC TAPE-CASSETTE APPARATUS COMPRISING AT LEAST TWO PUSH-BUTTONS

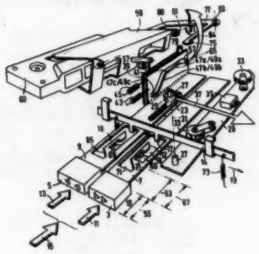
Klaus Kommoss, Wetzlar-Naunheim, and Valentin H. Schütte, Wetzlar, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 312,479, Oct. 19, 1981, abandoned. This application Nov. 14, 1983, Ser. No. 551,502

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1980, 3042748

Int. Cl.³ G11B *15/00*

U.S. Cl. 360—137 **12 Claims**



1. A magnetic-tape-cassette apparatus comprising

at least two push-button members, arranged to be movable within the apparatus to perform different functions, and

a movable cassette compartment arranged for receiving a cassette,

characterized in that said compartment includes a guide element, and

each of two said members comprises a bracket portion having a profile engaged by said guide element, said profiles being identical and each having an inclined portion arranged for moving said guide element, said brackets and profiles being arranged such that they jointly control said guide element and are engageable with the guide element to move it only when said two push-button members are depressed concurrently.

4,503,477

METHOD AND ARRANGEMENT FOR PROTECTING A THYRISTOR SWITCH OF A PULSE GENERATOR

Henrik Henriksen; Torben G. Nielsen, and Claus E. Taarning, all of Ballerup, Denmark, assignors to F. L. Smidth & Company, Cresskill, N.J.

Filed May 20, 1982, Ser. No. 380,290

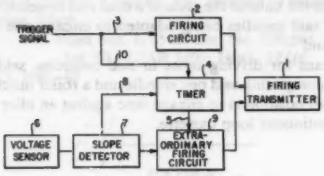
Claims priority, application United Kingdom, May 21, 1981, 8115606

Int. Cl.³ H02H *7/09*

U.S. Cl. 361—2 **34 Claims**

1. A method for protecting a semiconductor switching element of an energy conserving pulse generator, which supplies high voltage pulses to a capacitive load, against damage from a spark-over in the load comprising the steps of:

(a) determining when a pulse is supplied to said load;
(b) detecting the occurrence of a spark-over; and



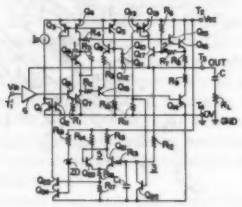
(c) triggering the semiconductor switching element to assume a substantially conductive state when a spark-over is detected during the supply of a pulse.

4,503,478

TRANSISTOR POWER AMPLIFIER CIRCUIT

Kunio Seki, Tokyo, and Ritsuji Takeshita, Hino, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 26, 1979, Ser. No. 52,207
Claims priority, application Japan, Jul. 26, 1978, 53-90471
Int. Cl.³ H02H *7/20*
U.S. Cl. 361—79 **8 Claims**



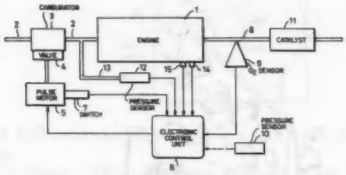
1. A transistor power amplifier circuit comprising:
a first output transistor disposed between a first potential and a first output terminal;
a second output transistor disposed between said first output terminal and a second potential;
a drive circuit connected to said first and second output transistors for driving said first and second output transistors in a push-pull manner;
an operation detector circuit for detecting the operation of said first output transistor;
a level detector circuit for detecting the d-c voltage level of said first output terminal; and
a control circuit which is controlled by the outputs of said operation detector circuit and said level detector circuit to control said drive circuit;
wherein said operation detector circuit includes means for detecting when the operation of said first output transistor has deviated beyond a predetermined level which is set between a locus of an a-c operation of said first output transistor under a clipped operating condition thereof and an a-c safety operation region of said first output transistor, said level detector circuit including means for detecting a d-c voltage level of said first output terminal to determine when it is short-circuited to said second potential in a d-c manner, and said drive circuit including means responsive to an output of said control circuit in the case where the operation of said first output transistor deviates beyond said predetermined level or that said first output terminal is short-circuited to said second potential to restrict the operation of said first output transistor within a restriction level which is set within a d-c safety operation region of said first output transistor.

4,503,479

ELECTRONIC CIRCUIT FOR VEHICLES, HAVING A FAIL SAFE FUNCTION FOR ABNORMALITY IN SUPPLY VOLTAGE

Kazuo Otsuka, Higashikurume; Shin Narasaka, Yono, and Shumpei Hasegawa, Niiza, all of Japan, assignors to Honda Motor Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 297,998, Aug. 31, 1981, abandoned.
This application Aug. 31, 1983, Ser. No. 528,236
Claims priority, application Japan, Sep. 4, 1980, 55-122594
Int. Cl.³ H02H *3/20, 3/24*
U.S. Cl. 361—90 **5 Claims**



1. An electronic circuit for use in a vehicle which is equipped with an internal combustion engine and an electrical power source, said electronic circuit consisting essentially of:
a power-supply circuit for controlling a voltage supplied from said power source to a predetermined voltage;
at least one electrical apparatus installed in said vehicle, said electrical apparatus being capable of changing the amount of air or fuel to be supplied to said engine;
a control circuit arranged to be supplied with power from said power-supply circuit and having a central processing unit for controlling the operation of said at least one electrical apparatus, said central processing unit being susceptible to erratic operation when said voltage supplied thereto by said power-supply circuit is outside a predetermined range defined by a predetermined upper limit voltage and a predetermined lower limit voltage, said central processing unit being resettable;
a detecting circuit consisting essentially of a first comparator for comparing the voltage of said power supplied from said power-supply circuit with said predetermined upper limit voltage and a second comparator for comparing the voltage of said power supplied from said power-supply circuit with said predetermined lower limit voltage, said detecting circuit being adapted to produce an output signal immediately when said power has a voltage lying out of said predetermined range determined by said upper and lower limit voltages, and to stop producing said output signal immediately when the voltage of said power supplied from said power-supply circuit is restored to a value within said predetermined range,
said first comparator having an inverting input terminal and a non-inverting input terminal, the non-inverting input terminal of said first comparator being connected substantially directly to the output of said power-supply circuit,
said second comparator having an inverting input terminal and a non-inverting input terminal, the inverting input terminal of said second comparator being connected substantially directly to the output of said power-supply circuit,
means for applying a first predetermined voltage delimiting an upper limit of said predetermined power-supply circuit voltage range to the inverting input terminal of said first comparator,
means for applying a second predetermined voltage delimiting a lower limit of said predetermined power-supply circuit voltage range to the non-inverting input terminal of said second comparator, and
an OR circuit having first and second input terminals

substantially directly connected to outputs of said first and second comparators respectively; and

means immediately responsive to said output signal of said detecting circuit to reset said central processing unit and to keep said central processing unit reset so long as said output signal is present, whereby said central processing unit remains connected to said power-supply circuit but is temporarily and immediately rendered inoperative at those times when the voltage applied thereto from said power-supply circuit is outside said predetermined range.

4,503,480

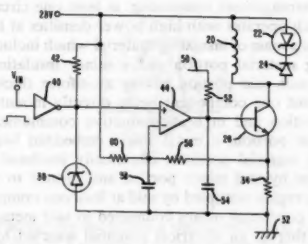
VOLTAGE COMPENSATING DRIVER CIRCUIT

Ronald D. Pickard, Groton; John W. Reece, and Joseph W. Racette, both of Ithaca, all of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 17, 1983, Ser. No. 467,526

Int. Cl.³ H01H *47/32*

U.S. Cl. 361—152 **15 Claims**



1. A compensated reference voltage arrangement for pulsing a reactive load comprising a

reactive load, a

supply voltage, a

comparator providing an output, a

transistor having its base coupled to said output and having means for coupling its collector to said reactive load, a

resistor coupled to the emitter of said transistor and to a fixed ground for sensing emitter voltage, a

buffer having an input voltage coupled thereto and having an output coupled to an input terminal of said comparator,

resistor means and capacitor means coupled to the supply voltage and to the emitter of the transistor for controlling flow of current through the reactive load, and

diode means coupled to the fixed ground and to the buffer output for determining the maximum voltage applied to the input terminal of the comparator.

4,503,481

GAS INSULATED SWITCHGEAR EQUIPMENT

Sigeru Fujiya; Tohru Tsubaki; Naoki Amano, all of Hitachi; Kyuzi Yaginuma, Katsuta; Hitoshi Kayaba; Yoriyuki Aiko, both of Hitachi, and Takeshi Takahashi, Hitachiota, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

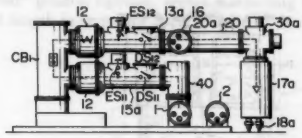
Filed Mar. 26, 1982, Ser. No. 362,047

Claims priority, application Japan, May 20, 1981, 56-75020; Jun. 19, 1981, 56-94056

Int. Cl.³ H02B *1/04*

U.S. Cl. 361—341 **16 Claims**

1. A gas insulated switchgear equipment comprising two main bus bars substantially parallelly supported on a mounting surface, a plurality of circuit breakers disposed on said mounting surface at one side of said main bus bars, first and second electric lines connected to each of said circuit breakers, bus means disposed on the main bus side of said circuit breakers for electrically connecting said circuit breakers in series, said bus means extending substantially parallel with said main bus bars,



and said plurality of circuit breakers being disposed on a dipposition line which is substantially parallel with said main buses.

4,503,482

CERAMIC DIELECTRIC BASIS ON BISMUTH-CONTAINING $BATIO_3$

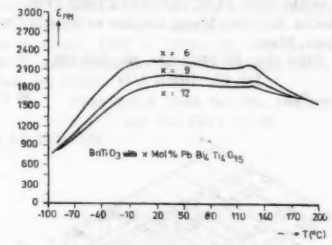
Detlev Hennings, and Herbert Schreinemacher, both of Aachen, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 28, 1983, Ser. No. 536,482

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1982, 3237571

Int. Cl.³ H01B *3/02*; C04B *35/46*

U.S. Cl. 361—321 **14 Claims**



8. A ceramic multilayer capacitor comprising:

a plurality of layers of ceramic dielectric material; and

a plurality of layers of metallic electrodes, one metallic electrode layer arranged between two layers of ceramic dielectric;

characterized in that the ceramic dielectric layers consist essentially of a monophase ceramic in the form of a mixed crystal of $BaTiO_3$ and 0.02 to 0.12 mol of the perovskite $PbBi_4Ti_4O_{15}$ for each mol of $BaTiO_3$.

4,503,483

HEAT PIPE COOLING MODULE FOR HIGH POWER CIRCUIT BOARDS

Algerd Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, El Segundo, Calif.

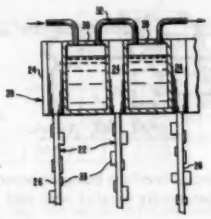
Filed May 3, 1982, Ser. No. 374,118

Int. Cl.³ H05K *7/20*

U.S. Cl. 361—385 **13 Claims**

1. A heat pipe cooling module which cools electronic components and which includes condenser and evaporator sections and a working fluid therein, said evaporator section comprising a sandwich construction of a pair of flat outer plates to which the electronic components are to be thermally coupled, at least one wick pad adjacent one of said outer plates, and a plurality of spaced bars between said wick pad and the other of said outer plates and extending from said evaporator to said condenser sections to define structural support between said

plates for resisting any deformation forces exerted thereon and from consequent decreased heat flow therein and to define a



plurality of independent vapor flow channels to said condenser section.

4,503,484

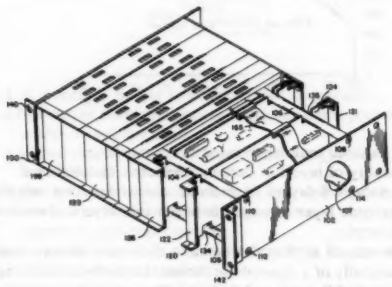
CHASSIS FOR ELECTRONIC CIRCUITRY

Edwin C. Moxon, Boxboro, Mass., assignor to Stypher Corporation, Hudson, Mass.

Filed Oct. 28, 1983, Ser. No. 546,209

Int. Cl.³ H05K *1/14*

U.S. Cl. 361—395 **29 Claims**



1. An electronic chassis assembly comprising,

a first planar side plate,

a second planar side plate,

a plurality of frame support rods attached perpendicularly to the planes of said side plates and extending between said first and said second side plates to hold said side plates in spaced parallel relationship,

at least one circuit module, comprising

at least one planar circuit board for mounting electronic circuits thereon, said board having notches therein removably engaging said support rods and holding said board between said first and second side plates perpendicularly to said frame support rods,

a front panel attached perpendicularly to one end of said board,

a back panel attached perpendicularly to the other end of said board, said front and back panels forming the front and back faces of said chassis assembly, and

means enclosing the top and bottom of said chassis assembly.

4,503,485

ARRANGEMENT FOR CARRYING ELECTRICAL AND/OR ELECTRONIC COMPONENTS

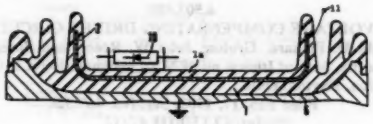
Klaus H. Geissler, Backnang, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 312,153, Oct. 16, 1981, abandoned. This application Jan. 24, 1984, Ser. No. 573,583

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1980, 3039440

Int. Cl.³ H05K *7/20, 9/00*

U.S. Cl. 361—424 **4 Claims**



1. An arrangement comprising: at least one circuit component which operates with high power densities at high potential levels; a mass of insulating material which includes a major insulating material portion and a minor insulating material portion, each said portion having a uniform thickness, with said at least one component being directly mounted on said minor portion and in heat-conductive communication with said minor portion; a metal shield embedded between said insulating material portions, electrically insulated from said component by said minor portion and formed to partly surround the region occupied by said at least one component; and electrical conductor means connected to said metal shield for applying thereto an electrical potential selected to minimize the potential between said at least one component and said shield across said minor portion, wherein said shield and said insulating material portions are formed for enabling said shield to receive power dissipated by said at least one component through said minor portion at high heat flux density and for causing heat received by said shield to be removed through said major portion with low heat flux density.

4,503,486

SELF-LOCKING NUT FOR ADJUSTABLE HEADLAMP ASSEMBLY

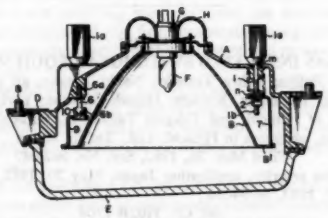
Hiroyuki Makita, Shimizu, Japan, assignor to Koito Manufacturing Company Limited, Tokyo, Japan

Filed Aug. 23, 1983, Ser. No. 525,584

Claims priority, application Japan, Aug. 31, 1982, 57-132540

Int. Cl.³ B60Q *1/06*; F16B *37/00*

U.S. Cl. 362—61 **10 Claims**



1. In a lamp assembly for an automobile including a support member formed with mounting slots, self-locking nuts respectively secured to said slots and supported by said support member, optical axis adjusting rods respectively threadedly connected to said self-locking nuts, and a tilting member connected to said optical axis adjusting rods and having an optical axis adjusted by said optical axis adjusting rods relative to said

support member, the improvement comprising each said self-locking nut being formed with two engaging grooves in directions perpendicular to each said optical axis adjusting rod and engaged with each said mounting slot of said support member, one of said engaging grooves having two opposite surfaces formed with round extensions extending toward each other and the other of said engaging grooves having a bottom which is convex along its generatrix, said generatrix being located in a plane substantially perpendicular to the plane containing the arcs of said extensions.

4,503,487

SHOCK-CUSHIONED LAMP MOUNTING STRUCTURE FOR USE IN A VEHICLE

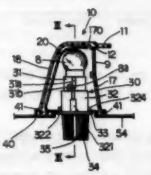
Yosiro Kakuda, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Oct. 12, 1983, Ser. No. 541,250

Claims priority, application Japan, Nov. 18, 1982, 57-174761[U]

Int. Cl.³ B60Q *1/00*

U.S. Cl. 362—80 **6 Claims**



1. A structure for mounting a shock-cushioned license plate lamp on a face of a vertically rotatable rear door, comprising:

a license plate lamp;

a lamp socket having projections at peripheral portions thereof, and means for mounting the license plate lamp at an upper portion thereof;

a lamp housing in which the lamp and socket are positioned, having an aperture adjacent to the lamp;

shock absorbing means for absorbing a shock generated when opening and closing the vertically rotatable door, positioned between a mounting end of the lamp housing and a face on the vertically rotatably door;

a protector base plate having an aperture, in which the lamp socket is inserted, the aperture having notches along the periphery thereof, which are engageable with the projections of the lamp socket, and the plate is mounted on the shock absorbing means; and

a fastening means for securing the lamp housing and the shock absorbing means to a face on the vertically rotatable door, whereby the lamp socket is mounted only through the shock absorbing means onto the vertically rotatable door.

4,503,488

MULTIPLE HEADLAMP SYSTEM

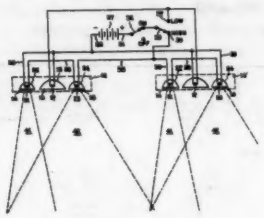
Thomas F. Soules, Cleveland Heights, and Milan R. Vukcevich, Burton, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 401,037, Jul. 22, 1982, abandoned. This application Jul. 13, 1984, Ser. No. 630,994

Int. Cl.³ B60Q *1/26*

U.S. Cl. 362—80 **5 Claims**

1. A vehicle headlamp system for connection to a voltage source, comprising first and second sets of headlamps respectively located near the left and right side at the front of the vehicle, each of said first and second sets of headlamps comprising a plurality of individual headlamps each containing a single filament located at the focal point of the reflector member in said individual headlamps, one of the headlamps in each set being designed to provide a relatively narrow beam for "punch" light and having a shorter length filament and reduced diameter reflector than the filament and reflector in the other of said headlamps providing a relatively wide beam for "spread" general lighting, means connecting the filaments of equal length in series for each of said first and second sets of



headlamps, and means for connecting said series-connected filaments across said voltage source, wherein comparative optical efficiency to that of conventional headlamps is obtain with reflectors of reduced diameter and filaments of reduced length.

4,503,489

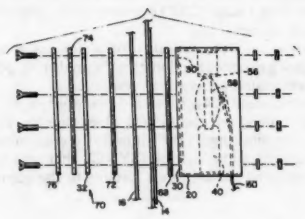
ABOVE GROUND LOW VOLTAGE UNDERWATER LIGHT

Peter C. Duerr, 4757 W. 175th Pl., Country Club Hills, Ill. 60477, and Claude De Facci, 22536 Lake Shore Dr., Richton Park, Ill. 60471

Filed Apr. 4, 1984, Ser. No. 596,658

Int. Cl.³ F21V *33/00*

U.S. Cl. 362—101 **20 Claims**



1. An underwater light and above ground swimming pool combination having a pool wall extending above ground level and having an opening therein which extends therethrough between an outer and inner surface, comprising

a housing having a front wall with an opening therein which is not larger than the opening in said pool wall, said housing being mountable in cantilever fashion on the outer surface of said pool wall with the front wall thereof adjacent to said outer surface and the opening in said front wall communicating with the opening in said pool wall,

mounting means within said housing for mounting a light generating light assembly means to transmit light through said openings in said front wall and pool wall,

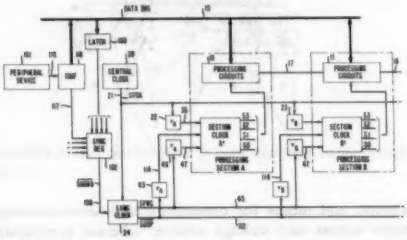
a light transmitting cover assembly mounted within said pool on said inner surface for sealingly closing said opening of the front wall of the housing with an edge of the pool wall defining said opening in the pool wall disposed therebetween, and

access means for providing access to the light assembly within said housing without demounting of said housing or cover assembly.

4,503,490
DISTRIBUTED TIMING SYSTEM

John S. Thompson, Tinton Falls, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 10, 1981, Ser. No. 272,300
Int. Cl.³ G06F 1/04
U.S. Cl. 364—200 4 Claims



1. A timing system for distributing clock signals in a synchronous processing system having plural processing sections (A,B), the timing system includes a central clock circuit (20) for producing a continuous sequence of system clock signals (SYCK); the timing system BEING CHARACTERIZED BY:

a plurality of section clock circuits (A',B'), each section clock circuit being located in and associated with a different one of the processing sections of the processing system;

means for transmitting the continuous sequence of system clock signals to the section clock circuits as section master clock signals;

each section clock circuit being arranged to respond to the section master clock signals applied thereto for stepping through a plurality of states (CS0', CS1', CS2', CS3') including a state (CS3') common to the plurality of section clock circuits;

in response to the plurality of states, each section clock circuit generates section clock signals (S0, S1, S2, S3) for its associated processing section; and

an arrangement (24), repeatedly responsive to the continuous sequence of the system clock signals, for producing and transmitting to the plurality of section clock circuits synchronization signals (SYNC) that routinely set the plurality of section clock circuits to the common state.

4,503,491
COMPUTER WITH EXPANDED ADDRESSING CAPABILITY

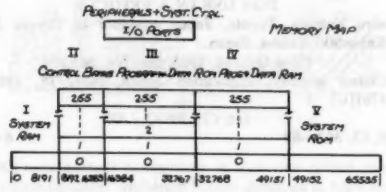
Alexander S. Lushtak, San Francisco, and John S. Forker, Los Altos, both of Calif., assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 29, 1981, Ser. No. 278,840
Int. Cl.³ G06F 9/00, 13/00
U.S. Cl. 364—200 1 Claim

1. A computer with an expanded addressing capability comprising:

processor means having an address bus with a plurality of address lines for generating and supplying addresses through said address bus;

a plurality of addressable banks which are divided into a plurality of distinct address ranges, one of said address ranges including a plurality of read-only memory banks, each of which bank being implemented in the form of at least one monolithic integrated circuit having first and second bias supply terminals, said first bias supply terminal being designed to be connected to a reference potential and said second bias supply terminal being designed to be connected to a biasing potential, said plurality of addressable banks comprising a first plurality of read-only memory banks within one of said address ranges for storing respective programs to control respective items of peripheral equipment operatively associated with said computer, a second plurality of read-only memory banks within a second of said address ranges for storing respective programs and/or data for respective applications which can be performed by said computer, and a plurality of read-and-write memory banks within another of said address ranges for storing variable information for use by said computer, said second of said address ranges, in addition to a plurality of read-only memory banks, also having an addressable hardware bank comprising at least one item of



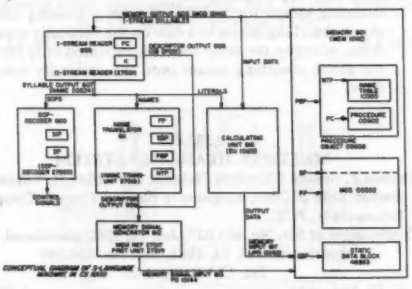
peripheral equipment which is controlled by one of said read-only memory banks of said one of address ranges; and

banks preselection means for preselecting any bank of any address range such that if any address is supplied on said address bus of said processor means, it will be effective only at the preselected bank and all other non-preselected banks will be inactive and not addressed by said processor means, said bank preselection means being arranged to cause said second bias supply terminal to be connected to said biasing potential when said bank is selected and to be connected to said reference when said bank is not selected.

4,503,492
APPARATUS AND METHODS FOR DERIVING ADDRESSES OF DATA USING PAINTERS WHOSE VALUES REMAIN UNCHANGED DURING AN EXECUTION OF A PROCEDURE

John F. Pilat, Raleigh, N.C., assignor to Data General Corp., Westborough, Mass.

Filed Sep. 11, 1981, Ser. No. 302,261
Int. Cl.³ G06F 9/36
U.S. Cl. 364—200 28 Claims



1. In a digital computer system including

a memory means for performing memory operations including storing and providing items of data including instructions in response to memory commands, each one of said memory commands specifying one said memory operation and an address of one of said items of data in said memory means, and

(B) processor means connected to said memory means for

providing said memory commands in response to said instructions,

and wherein

said items include pointers representing said addresses and said processor means performs a call operation for commencing an execution of any sequence of said instructions by said processor means,

means for providing said addresses of said items comprising:

(1) a linkage pointer, said linkage pointer being a certain one of said pointers which is associated with said execution currently being executed by said processor means and which represents a said address which remains constant for the duration of said execution;

(2) an immediate name of said items representing another said item and specifying said linkage pointer;

(3) register means in said processor means for storing said address represented by said linkage pointer;

(4) immediate name translation means responsive to any said immediate name received in said processor means for calculating said address of said item represented by said received immediate name using said represented address stored in said register means; and

(5) loading means responsive to said call operation for obtaining said linkage pointer associated with said execution being commenced by said call operation, deriving said represented address, and loading said represented address into said register means.

4,503,493

NC MACHINE FOR PRODUCING TANGENTIAL ENTRY TO AND EXIT FROM A COMPENSATED CONTOUR

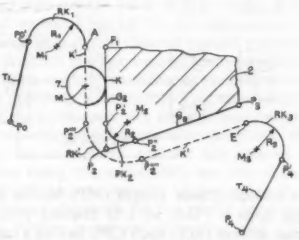
Horst Burkhardt, Truchlaching; Josef Huber, Engelsberg, and Norbert Vollmayr, Traunwalchen, all of Fed. Rep. of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Mar. 30, 1982, Ser. No. 363,474

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1981, 3113970

Int. Cl.[3] **G05B** *13/04, 19/24*

U.S. Cl. 364—170 **9 Claims**



1. An improved numerically controlled machine tool for controlling movement of a tool along a workpiece contour with compensation for tool radius, which includes an electronic control including: an input unit; a memory; a computer provided with means for arc interpolation and straight line interpolation; and a drive arrangement, responsive to the electronic control, for movement of the tool; wherein the improvement comprises:

means for supplying first and second radii which define curvatures of arcs to be made by the tool before the tool comes into contact with the workpiece contour and after the tool leaves contact with the contour;

means for supplying a rounding signal;

means, responsive to the rounding signal, for transforming the first and second rounding radii into parameters required by the means for arc interpolation for pointwise calculation of respective entry and exit rounding arcs from the parameters, said entry rounding arc intersecting a starting point of the workpiece contour tangentially and passing via a first tangent to a first prescribed point, said exit rounding arc intersecting an end point of the workpiece contour tangentially and passing via a second tangent to a second prescribed point.

4,503,494

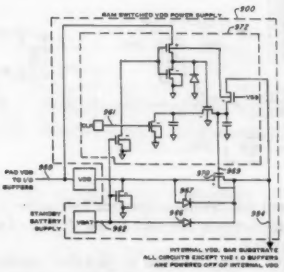
NON-VOLATILE MEMORY SYSTEM

Stephen P. Hamilton, Midland, and Harry G. McFarland, Lubbock, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 26, 1980, Ser. No. 163,237

Int. Cl.[3] **G06F** *7/38, 1/04;* **H02J** *9/04*

U.S. Cl. 364—200 **7 Claims**



1. A non-volatile read/write memory system which derives power from either an external power source or a standby battery source and receives clock signals from an external clock generator comprising:

a single integrated circuit chip having a power switching circuit and a read/write memory located thereon,

said power switching circuit including a clock detection circuit and a steering controller circuit, (a) said clock detection circuit for receiving clock signals from said external clock generator and for producing an enable signal to said steering controller circuit when clock signals are detected, (b) said steering controller circuit having as inputs said enable signal and predetermined voltages from said external power source and said standby battery source and an output which provides continuous power to said read/write memory, including a controllable switch for connecting said predetermined voltage of said external power source to said output when said enable signal is received, at least one forward biased diode coupling said external power source to said output and at least one forward biased diode coupling said standby battery source to said output, whereby

said steering controller circuit produces an output voltage essentially equal to the voltage of said external power source when an enable signal is present at its input and produces an output voltage less than the voltage of said external power source when the enable signal is not present even if the external power source is still present at said predetermined voltage.

4,503,495

DATA PROCESSING SYSTEM COMMON BUS UTILIZATION DETECTION LOGIC

Daniel A. Boudreau, Billerica, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jan. 15, 1982, Ser. No. 339,551

Int. Cl.[3] **G06F** *3/00*

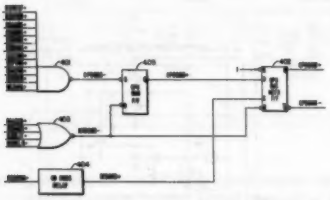
U.S. Cl. 364—200 **17 Claims**

1. A control circuit for detecting the utilization of a common resource by a particular device of a plurality of devices, use of said common resource being granted to a granted device of

said plurality of devices on a priority basis during an allocation cycle, said granted device having the highest priority of all devices requesting use of said common resource during said allocation cycle said particular device having a known requesting priority that is different from that of all other devices of said plurality of devices, said control circuit comprising:

A. first receiving means, coupled to said common resource, said first receiving means for receiving request signals from said common resource indicative of the priority of any device of said plurality of devices requesting use of said common resource;

B. second receiving means, coupled to said common resource, said second receiving means for receiving a grant



signal from said common resource indicative of the granting of said common resource to one device of said plurality of devices;

C. deductive means, coupled to said first receiving means and said second receiving means, said deductive means for determining that the priority of said granted device of said plurality of devices granted use of said common resource was not greater than or less than the priority of said particular device; and

D. indicative means, coupled to said deductive means, said indicative means for producing a signal indicating that use of said common resource has been granted to said particular device.

4,503,496

MULTI-MICROCOMPUTER SYSTEM WITH DIRECT STORE ACCESS

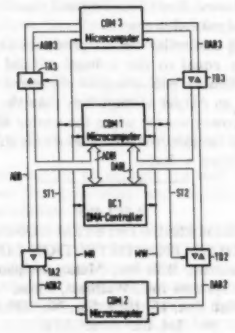
Peter Holzner, Germering, and Werner Sedlmeier, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 11, 1982, Ser. No. 347,695

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1981, 3104928; Feb. 11, 1981, 3104903

Int. Cl.³ G06F *15/16, 13/00*

U.S. Cl. 364—200 **10 Claims**



1. In a multi-microcomputer system having a plurality of microcomputers, each of said microcomputers having an individual read-write store, and being connected to an individual data bus and an individual address bus, the combination comprising;

a direct memory access controller connected directly to the data bus and address bus of a first of said microcomputers,

a first plurality of bus separator stages, each being connected between the data bus of said DMA controller and the data bus of an individual one of said microcomputers, a second plurality of bus separator stages, each being connected between the address bus of said DMA controller and the address bus of an individual one of said microcomputers,

control means connected to said first microcomputer and to all of said bus separator stages for selectively connecting the data and address buses of said DMA controller with the data and address buses of individual microcomputers, whereby the read-write stores of two microcomputers are interconnected by means of said bus separator stages and said buses and data exchange may take place between connected read-write memories via said DMA controller,

and means connected between said microcomputers and said DMA controller for receiving memory read and memory write instructions from one of said microcomputers for controlling the direction of data exchange in response thereto.

4,503,497

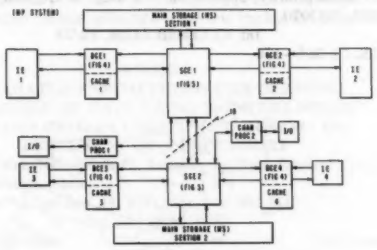
SYSTEM FOR INDEPENDENT CACHE-TO-CACHE TRANSFER

Matthew A. Krygowski, Hopewell Junction; Benedicto U. Messina, Poughkeepsie, and William D. Silkman, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 27, 1982, Ser. No. 382,842

Int. Cl.³ G06F *13/00, 15/16*

U.S. Cl. 364—200 **35 Claims**



1. In a multiprocessor system (MP) having plural central processing units (CPUs), an I/O channel processor, and a shared main storage (MS), each CPU having a cache directory and cache for receiving and casting-out lines of data from and to MS on MS bussing means, any cache in the MP becoming a requesting cache when it does not contain a data line having a data unit requested by the associated CPU which is signalled as a missed request by cache directory controls, the MP comprising:

cross-interrogation (XI) means for receiving each CPU request missed in a requesting cache to search directories for all other caches in the MP for a data line containing the requested data unit, any other cache being found by the XI means to have a data line containing the requested data unit being designated as a XI hit line in a XIH cache,

control communication means associated with the XI means for control signalling to the requesting cache when a XIH line is to be transferred from the XIH cache,

data bussing means separate from the MS bussing means for transferring the XIH line of data from the XIH cache to the requesting cache without passing the data through MS or synchronizing the transfer with the availability of the MS bussing means,

means for starting a data transfer on the data bussing means by first transferring the requested data unit and then transferring the remainder of the data line from the XIH cache to the requesting cache,

whereby the requesting CPU can begin execution with the requested data unit before the cache-to-cache transfer of the data line is completed,

the MS bussing means being available for an MS operation for a different data line during the cache-to-cache transfer of the data line on the data bussing means, whereby the cache-to-cache data transfer is not delayed by MS being busy with other requests.

4,503,498

MULTIPROCESSOR CRATECONTROLLER

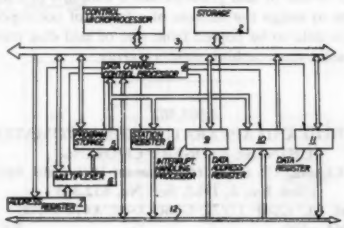
Lyubomir Y. Antonov; Alexander M. Trenev; Angel M. Angelov, and Kostadin D. Yanev, all of Sofia, Bulgaria, assignors to Baza Za Avtomatizacia Na Nauchniawxperiment, Sofia, Bulgaria

Continuation-in-part of Ser. No. 111,310, Jan. 11, 1980,. This application Jun. 18, 1982, Ser. No. 389,926

Claims priority, application Bulgaria, Jan. 11, 1979, 42038

Int. Cl.³ G06F *13/00*

U.S. Cl. 364—200 **1 Claim**



1. In a multiprocessor cratecontroller containing a control microprocessor with storage, each of them being bidirectionally connected with the bus of the microprocessor, the improvement comprising a data channel control processor connected with a program storage, a multiplexer, an address register of the program storage, a register of stations, an interruptions handling processor, a data address register, a data register and the bus of the microprocessor wherein said program storage is connected with the bus of the microprocessor, the register of stations, the multiplexer, and the data address register, said multiplexer being connected with the bus of the microprocessor and the address register of the program storage, which is connected also with the bus of the microprocessor; the register of stations being also connected with a CAMAC bus; said interruptions handling processor, the data address register and the data register being connected with the bus of the microprocessor and the bus of the CAMAC.

4,503,499

CONTROLLED WORK FLOW SYSTEM

Gary R. Mason, Agoura; Kenneth W. Speaker, Studio City; James L. Macropol, Camarillo, all of Calif.; Robert A. McKie, Rome, N.Y., and Sidney C. Bailin, Washington, D.C., assignors to Eaton Corporation, Cleveland, Ohio

Filed Sep. 14, 1982, Ser. No. 419,216

Int. Cl.³ G06F *15/16*

U.S. Cl. 364—200 **16 Claims**

MICROFICHE APPENDIX INCLUDED

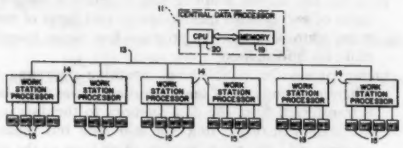
(9 Microfiche, 538 Pages)

1. A computer system for improving the efficiency in carrying out a project involving the creation or modification of the multiplicity of documents by a multiplicity of individuals comprising:

storage means to electronically store a schedule of a multiplicity of work events comprising a stored packet of data for each work event, each of said packets identifying (1) a document, (2) a task to be performed with respect to said document selected from a set of tasks including creation of the document and modification of an existing document, (3) the individual who is assigned the task to be performed on the document, (4) an indication of whether the work event corresponding to the packet is completed, and (5) whether or not the commencement of the work event corresponding to the packet must await the completion of a preceding work event in said schedule;

document storage means to electronically store existing documents identified in said stored packets of said schedule;

keyboard means to generate input signals representing data,



display means to display data transmitted to said display means;

data control means (1) operable to process the data in said packets and cause said display means to display the identification of uncompleted work events in said schedule which do not await the completion of preceding uncompleted work events (2) responsive to input signals received from said keyboard means for selecting one of the work events identified by said display means to cause the document of the selected work event as stored in said document storage means to be displayed by said display means, and (3) responsive to input signals received from said keyboard means to modify or create the document of the selected work event and to store the document as modified or created in said document storage means.

4,503,500

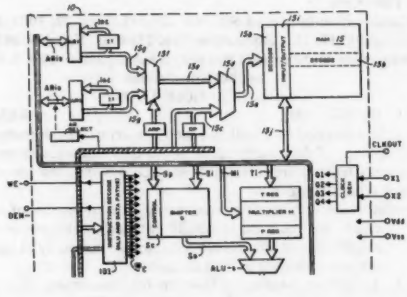
MICROCOMPUTER WITH BUS INTERCHANGE MODULE

Surendar S. Magar, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 347,860, Feb. 11, 1982,. This application Jun. 15, 1984, Ser. No. 619,650

Int. Cl.³ G06F *3/00*

U.S. Cl. 364—200 **9 Claims**



1. A microcomputer formed in a single integrated circuit comprising:

an arithmetic/logic unit having data input and data output;

a data memory having an address input and having data input/output means;

data bus means coupled to the data input and data output of the arithmetic/logic unit and coupled to the data input-/output means of the data memory, the data bus means transferring multi-bit data;

a program memory having an address input and having an instruction output, the program memory storing instruction words;

program address means having an input and including incrementing means; said program address means having an output connected to said address input of the program memory means;

control means for generating controls in response to instruction words; the controls defining operation of the arithmetic/logic unit, transfer of multi-bit data to and from the data bus means, and operation of said program address means;

program bus means coupling said instruction output to an input of said control means, and to said input of said program address means, the program bus means transferring multi-bit information;

timing means for establishing repetitive operating cycles wherein during one of said operating cycles multi-bit data is transferred from the data memory to the data input of the arithmetic/logic unit via said data bus means, the program address means applies an address to the address input of the program memory, and the control means receives an instruction word from the instruction output via said program bus means;

bus interchange means within said integrated circuit and coupled to said data bus means and to said program bus means for

(a) transferring said multi-bit data from the data bus means to the program bus means and for transferring said multi-bit data from the program bus means to said input of said program address means, both during one of said operating cycles, and

(b) transferring said multibit information from said instruction output of said program memory to said program bus means and transferring said multibit information from said program bus means to said data bus means, both during one of said operating cycles,

(c) all said transferring being in response to controls received from said control means generated from a single one of said instruction words.

4,503,501

ADAPTIVE DOMAIN PARTITIONING OF CACHE MEMORY SPACE

Richard L. Coulson, Stanford, Calif.; Ronald L. Blickenstaff, Boulder, Colo.; P. David Dodd, Boulder, Colo.; Robert J. Moreno, Boulder, Colo., and Dean P. Kinard, Longmont, Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Continuation-in-part of Ser. No. 325,351, Nov. 27, 1981, Pat. No. 4,430,712. This application Nov. 15, 1982, Ser. No. 441,791

The portion of the term of this patent subsequent to Feb. 7, 2001, has been disclaimed.

Int. Cl.³ G06F *13/00*

U.S. Cl. 364—300 **8 Claims**

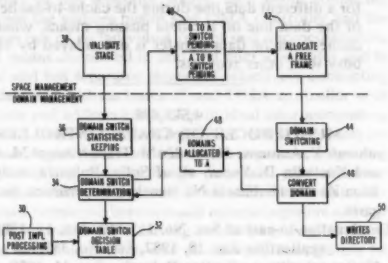
1. In a method of dividing a memory array into domains for the storage of data received in plural differing predetermined amounts from plural classes of storage devices, the improvement which comprises:

effectively subdividing said array into domains of sizes which are each substantially integral multiples of said predetermined amounts of data stored therein by assigning starting addresses to said domains.

7. A caching memory subsystem for attachment to a host computer and magnetic disk devices of differing classes, in which various predetermined amounts of data are stored on the tracks of the disk of each class of disk devices comprising:

a solid-state cache memory array and a cache manager, wherein said solid-state cache memory array is effectively divided into plural domains by assignment of starting addresses in said array to each domain, said domains being so sized as to contain substantially integral multiples of said predetermined amounts of data;

said cache manager comprising means for copying data stored on magnetic disk storage devices into said solid-state cache memory array; and



wherein said cache manager has means to divide each of said domains into frames sized to contain an amount of data equal to one of said predetermined amounts of data, and means to assign the address of a frame of corresponding size to data to be copied from one of said disk tracks to said solid-state caching memory array.

4,503,502

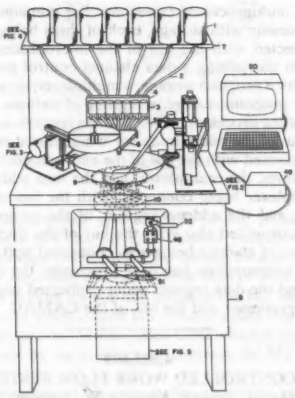
METHOD AND APPARATUS FOR AUTOMATED CHINESE STIR-FRY COOKING

Roger A. Chapin, 715 Boyd Rd., Pleasant Hill, Calif. 94523

Filed Jun. 3, 1983, Ser. No. 432,333

Int. Cl.³ G06F *15/20*; **G06G** *7/48*; **A47J** *27/00*

U.S. Cl. 364—400 **9 Claims**



1. A system for controlling the operation of a stir-fry cooking apparatus comprising:

a rotatable food container means for holding liquid and solid foods to be cooked;

means for rotating the food container means;

heating means positioned beneath the food container means;

a plurality of food dispensing means for dispensing liquid and solid foods into the container means;

stirring manipulator means for stirring the foods in the food container means;

first memory means for storing a plurality of recipe data;

second memory means for storing program data for operat-

ing the heating means, the food dispensing means, and the stirring manipulator means;

input means, connected to the first and second memory means, for inputting the recipe data into the first memory means and the program data into the second memory means;

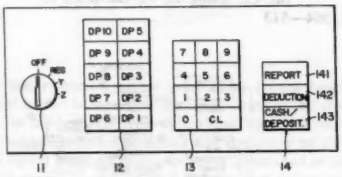
digital processing means, connected to the first and second memory means and the input means for controlling the operation of the heating means, the food dispensing means and the stirring manipulator means in accordance with selected recipe requirements and the program data corresponding to the selected recipe requirements stored in the first and second memories respectively.

4,503,503

TRANSACTION PROCESSING APPARATUS FOR STORING AND/OR CALCULATING COSTS, SALES, DEDUCTIONS, NUMBER OF SALES, COST MULTIPLIER, AND PROFIT, IN A DEPARTMENTALIZED FORMAT

Yasuo Suzuki, Nagaokakyo, Japan, assignor to Omron Tateisi Electronic Co., Kyoto, Japan

Filed Oct. 28, 1981, Ser. No. 315,890
Claims priority, application Japan, Nov. 5, 1980, 55-156591
Int. Cl.³ G06F *15/21, 15/30*
U.S. Cl. 364—405 **6 Claims**



1. A transaction processing apparatus for processing information related to a plurality of individual transactions as the transactions are carried out, comprising:

mode selecting means for setting said apparatus in a first mode or a second mode;

input means for entering data into said apparatus, said data including numerical data, department code data representing a plurality of department codes, each of said department codes representing a plurality of commodities, and deduction command data;

memory means for storing data, said memory means including: for each department code, a cost register for storing commodity cost data; for each department code, a sales amount register for storing sales amount data; a deduction register for storing deduction amount data; for each department code, a total deduction register for storing total deduction data; and a working register for storing inputted numerical data;

means responsive to said apparatus being in said first mode and to the entry of numerical data for storing said numerical data in said working register;

means responsive to said apparatus being in said first mode, and to each entry of said deduction command data for transferring the contents of said working register to said deduction register;

means responsive to said apparatus being in said first mode, and to each entry of said numerical data followed by the entry of department code data for adding the contents of said working register to the contents of said sales amount register for the entered department code;

means responsive to said apparatus being in said first mode, and to each entry of said deduction command data followed by the entry of said department code data for subtracting the contents of said deduction register from the contents of said sales amount register for the entered department code, and adding the contents of said deduction register to the contents of said total deduction register for the entered department code; and

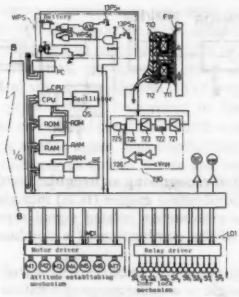
means responsive to setting said apparatus in said second mode for producing for each commodity code, total cost data using said commodity cost data, said sales amount data, and said total deduction amount data, and for producing total profit data by substracting said total cost data from said sales amount data.

4,503,504

ATTITUDE CONTROLLING DEVICE FOR A STEERING WHEEL

Nobuyasu Suzumura; Kazuyuki Umebayashi, and Takahiro Yamada, all of Tokyo, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 23, 1982, Ser. No. 401,154
Claims priority, application Japan, Aug. 21, 1981, 56-130884
Int. Cl.³ B62D *1/18;* G06F *15/20*
U.S. Cl. 364—425 **22 Claims**



17. An attitude controlling device for a steering wheel comprising:

a steering wheel attitude setting mechanism including a telescoping mechanism for positioning a steering wheel in the upward or downward direction along an axis of its inclination and a tilting mechanism for setting the inclination of said steering wheel;

a steering wheel driving means, coupled to both telescoping and tilting mechanism of said steering wheel attitude setting mechanism;

a position detecting means including a disc coupled to a rotating shaft of a motor in said steering wheel driving means and a detector for generating a pulse signal in accordance with a rotation of said disc;

a first attitude change instructing switch means for instructing a change in the vertical position of said steering wheel;

a second attitude change instructing switch means for instructing a change in the inclination of said steering wheel;

a storage instructing switch means for instructing the storage of attitude information relating to the vertical position and inclination of said steering wheel; and

an electronic control device for storing the vertical position and inclination data in a memory in response to the actuation of said storage instructing switch means, for energizing said steering wheel driving means to away position in response to at least one of (a) the opening of a door associated with a driver's seat, (b) the turning off of a power switch by an engine key, and (c) the actuation of manually operated AWAY switch, and for energizing said steering wheel driving means to driving position indicated by the stored attitude information in response to at least on of (a) the unlocking of the door associated with the driver's seat, (b) the closing of the door associated with the driver's seat, (c) the turning on of a power switch by the engine

key, and (d) the actuation of a manually operated AWAY switch.

4,503,505

METHOD FOR RECOGNIZING IRREGULAR COMBUSTION PROCESSES IN AN INTERNAL COMBUSTION ENGINE AND APPARATUS FOR PERFORMING THE METHOD

Eckard Damson, Stuttgart; Horst Franke, Löchgau; Ferdinand Grob, Besigheim; Winfried Moser, Markgröningen, and Klaus Müller, Tamm, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

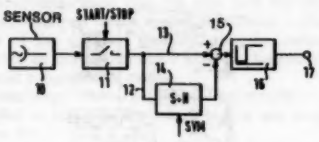
PCT No. PCT/EP81/00117, § 371 Date Feb. 3, 1982, § 102(e) Date Feb. 3, 1982, PCT Pub. No. WO82/02947, PCT Pub. Date Sep. 2, 1982

PCT Filed Aug. 11, 1981, Ser. No. 348,043

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1981, 3106107

Int. Cl.³ F02B *3/04;* **G01L** *23/22;* **G06F** *15/20*

U.S. Cl. 364—431.08 **25 Claims**



1. Method of recognizing an irregular combustion process in an internal combustion engine (ICE) including the steps of

deriving a combustion related signal representative of the course of the combustion of a combustion event in the engine;

associating the combustion related signal with a predetermined angle or angular range of rotation of a crankshaft of the engine,

and comprising, in accordance with the invention, the steps of

analyzing the wave form of the combustion related signal with respect to symmetry about a maximum value of the combustion related signal;

and providing an output signal representative of irregular combustion process if the wave form of the combustion related signal does not have a symmetrical relationship with respect to the maximum value thereof.

4,503,506

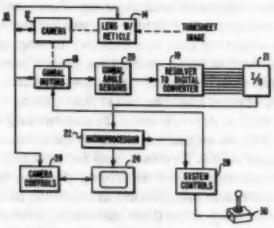
APPARATUS FOR MAPPING AND IDENTIFYING AN ELEMENT WITHIN A FIELD OF ELEMENTS

Robert H. Sturges, Jr., Plum Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 5, 1981, Ser. No. 289,955

Int. Cl.³ H04N *7/18;* **G06F** *15/20*

U.S. Cl. 364—513 **13 Claims**



1. Apparatus for identifying an element of a plurality of elements disposed within a field having at least first, second and third reference means, said apparatus comprising:

sighting means defining a line of sight to intersect an element of said plurality of elements and mounted to be operator manipulated so that said line of sight may intersect any of said plurality of elements, said sighting means being variably disposed in an unknown position with respect to said field, whereby a reference line is formed between said unknown position and said field;

orientation sensing means coupled to said sighting means for providing an angle signal indicative of the angle between said reference line and said line of sight and for providing a set of angle signals when said line of sight intersects said first, second, and third reference means for determining the plane of said field as defined by said first, second and third reference means; and

computing means responsive to said angle signal for identifying the position within said field of said element sighted by said sighting means.

4,503,507

ROBOT CONTROL DATA PROCESSING APPARATUS

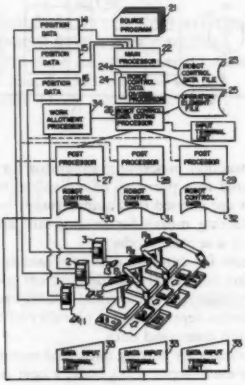
Kenji Takeda, Kamakura, and Yoshinao Arai, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 16, 1982, Ser. No. 389,077

Claims priority, application Japan, Jun. 17, 1981, 56-92287

Int. Cl.³ G06F *15/46;* **G05B** *19/42*

U.S. Cl. 364—513 **5 Claims**



1. A robot control data processing apparatus comprising:

robot control data dividing processor means for dividing robot control data, which is provided for monitoring and controlling robots, into a plurality of operation elements and for storing the robot control data in units each comprising an operation element; and

robot control data editing processor means coupled to said robot control data dividing processor means for selectively combining and editing one or more of the plurality of said operation elements for each robot to be controlled.

4,503,508

EXPOSURE CONTROL APPARATUS

Edward J. Brooks, and Carl N. Schauffele, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 12, 1982, Ser. No. 433,616

Int. Cl.³ G03B *7/091*

U.S. Cl. 364—525 **7 Claims**

1. Exposure control apparatus adapted for initial compensation by reference to luminance of known intensity and for

exposure control use by reference to luminance of unknown intensity comprising:

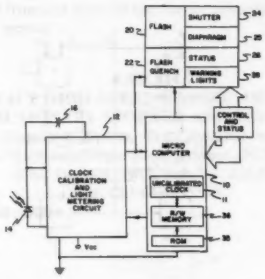
integrator means selectively coupled to the luminance of known intensity and the luminance of unknown intensity;

comparator means for producing a time interval signal when an electrical parameter of said integrator means reaches a threshold level established by the comparator means,

first reference signal generating means for generating a primary reference signal;

second reference signal generating means connected to the first reference signal generating means and producing a secondary reference signal that is covariant with the primary reference signal; and

control means for initiating the primary and secondary reference signals;



one of the reference signal generating means being connected to the comparator means to control the threshold level in accordance with the output signal of that reference signal generating means and the other of the reference signal generating means being connected to the integrator means so that the signal from that reference signal generating means is integrated by the integrator means,

said exposure control apparatus having an initial mode of operation in which an exposure parameter is controlled with the luminance of known intensity coupled to the integrator means and a field mode of operation in which the same exposure parameter is controlled with the luminance of unknown intensity coupled to the integrator means.

4,503,509

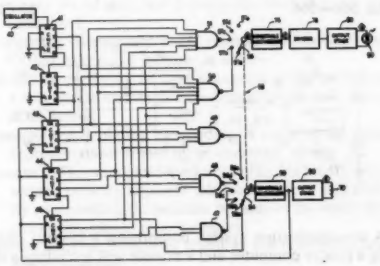
CALIBRATOR FOR TIMING METER

Thomas P. Becker; Christopher B. Stout, both of Kenosha, and Gene P. Hopp, Racine, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.

Filed Jul. 29, 1982, Ser. No. 402,843

Int. Cl.³ G05B *23/02;* G01P *21/00, 3/481*

U.S. Cl. 364—571 **16 Claims**



1. A calibrator for a timing meter which includes a combustion detector for producing a signal in response to the occurrence of combustion in an engine, a TDC detector for producing a signal in response to a top dead center event, a display for engine speed, and a display for timing angle, the calibrator being operative to check the engine speed display at least at first and second engine speeds and to check the timing angle display at least at first and second timing angles, the calibrator comprising an oscillator for generating a series of oscillator pulses, a plurality of cascaded counters responsive to pulses from said oscillator and generating outputs respectively corresponding to the decimal digits in the number of the oscillator pulses counted during a given period, each counter having a plurality of outputs on which appear electrical signals representing the numerical value of the digit corresponding to such counter, the first engine speed corresponding to electrical signals on a first set of outputs of said counters, the second engine speed corresponding to electrical signals on a second set of outputs of said counters, first circuit means responsive to the electrical signals on a selected one of said first and second sets of outputs to generate a reset signal and a speed enable signal, the reset inputs of at least some of said counters being coupled to said first circuit means and being responsive to the reset signal to become reset, inductive means coupled to said first circuit means and being responsive to the speed enable signal to produce an inductive signal for the TDC detector, the first timing angle corresponding to electrical signals on a third set of outputs of said counters, the second timing angle corresponding to electrical signals on a fourth set of outputs of said counters, second circuit means responsive to the electrical signals on a selected one of said third and fourth sets of outputs to generate a timing enable signal, and combustion simulation means coupled to said second circuit means and being responsive to the timing enable signal to produce a signal for the combustion detector.

4,503,510

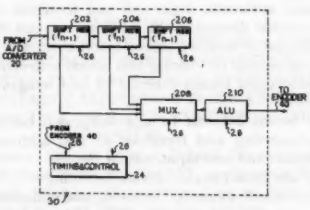
METHOD AND APPARATUS FOR DIGITAL DATA COMPRESSION

Charles S. Weaver, Palo Alto, Calif., assignor to SRI International, Menlo Park, Calif.

Division of Ser. No. 202,457, Oct. 31, 1980, Pat. No. 4,449,536. This application Dec. 5, 1983, Ser. No. 557,968

Int. Cl.³ G06F *15/31*

U.S. Cl. 364—715 **10 Claims**



1. Digital compression filter means for producing a stream of compressed digital signals, Δ_n, from an input stream of digital sample signals, f_n, comprising,

delay means having an input to which said input stream is supplied, said delay means including a plurality of sample signal length sections,

multiplexer means to which digital sample signal outputs from sections of the delay means are supplied, and

an arithmetic and logic unit responsive to digital sample signals from said multiplexer means, said arithmetic and logic unit having an output stream of compressed digital signals in accordance with the following equation

$$\Delta_n = y_n - y_{n-1} + 2^{-m2} y_{n-1}$$

wherein;

$$y_n = 0.5f_n - 0.5f_{n-1} + 2^{-m1} - 1f_{n-1},$$

m_1 and m_2 are positive integers, and

n is an integer comprising the argument, or index, of the function.

4,503,511

COMPUTING SYSTEM WITH MULTIFUNCTIONAL ARITHMETIC LOGIC UNIT IN SINGLE INTEGRATED CIRCUIT

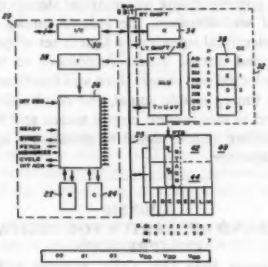
Jerry L. Vandierendonck, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 192,387, Sep. 30, 1980, abandoned, which is a continuation of Ser. No. 815,871, Jul. 14, 1977, Pat. No. 4,225,934, which is a continuation of Ser. No. 176,664, Aug. 31, 1971, Pat. No. 4,037,094. This application Jul. 13, 1982, Ser. No. 397,720

The portion of the term of this patent subsequent to Sep. 30, 1997, has been disclaimed.

Int. Cl.³ G06F *7/50*

U.S. Cl. 364—716 **19 Claims**



1. A computing system having an arithmetic logic unit for performing arithmetic and logic operations in response to coded instructions, said computing system comprising in combination:

a single semiconductor integrated circuit device containing said arithmetic logic unit and terminals for connecting external devices to the integrated circuit device;

addressable memory means external to said integrated circuit device for storing said coded instructions;

input/output means external to said integrated circuit device;

bus means external to said integrated circuit device and connecting said terminals to said addressable memory means and said input/output means;

said integrated circuit device including:

(a) decode means for receiving said coded instructions and providing a plurality of sets of output control signals respectively corresponding to the arithmetic and logic operations that can be performed by the computing system;

(b) said arithmetic logic unit comprising single logic circuit means for receiving said plurality of sets of control signals and selectively effecting arithmetic and logic operations corresponding to the selected operations;

(c) said arithmetic logic unit further including input means to receive data for operation by the logic circuit means and output means from which the result of the selected operation on such data is available;

(d) input selection means associated with said input means and responsive to said control signals to select input data to be applied to said logic circuit means;

(e) a plurality of data storage means for storing data for selective coupling by said input selection means to said input means and for receiving said result from said output means;

(f) means for coupling an address from said data storage means to said terminals for connection to said addressable memory means by said bus means;

(g) means for coupling a coded instruction from said terminals to said decode means.

4,503,512

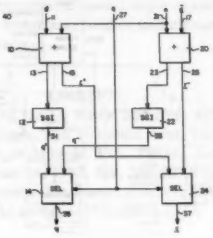
CELLULAR DIVISION CIRCUIT

Robert W. Doran, Palo Alto, Calif., assignor to Amdahl Corporation, Sunnyvale, Calif.

Filed Feb. 22, 1982, Ser. No. 351,208

Int. Cl.³ G06F *7/52*

U.S. Cl. 364—761 **8 Claims**



1. In a data processing system, a plurality of cascaded cellular division circuits, each of said cascaded circuits comprising:

first adder means for adding an n-bit dividend and an n-bit divisor thereby forming a first n-bit remainder,

second adder means for adding said n-bit dividend with the complement of said n-bit divisor thereby forming a second n-bit remainder,

means for complementing the highest order bit of each of said first and second remainders, thereby forming first and second quotient bits, respectively, and

selector means connected to receive said first and second quotients bits and said first and second remainder bits, said selector means responsive to a quotient bit signal from a preceding cascaded circuit for selecting said first or second quotient bit and said selector means responsive to said quotient bit signal for selecting said first or second remainders.

4,503,513

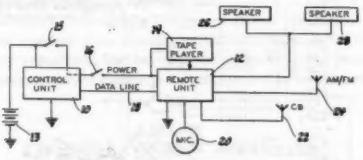
RADIO RECEIVER SYSTEM INCLUDING A CONTROL UNIT AND A REMOTE UNIT

Russell W. Pogue, Jr., Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 4, 1980, Ser. No. 175,122

Int. Cl.³ G06F *15/16;* H04B *1/38*

U.S. Cl. 364—900 **10 Claims**



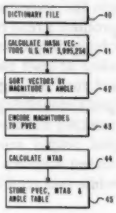
1. A communication system comprising a control unit including a master computer and a remote unit including a slave computer, a single wire bidirectional data bus interconnecting said master and slave computers, output means coupled to said slave computer, input means coupled to said master computer

for selecting operating functions of said output means, said master computer communicating information to said slave computer regarding the status of said input means and receiving information from said slave computer regarding the status of said output means, said master computer controlling the timing of the transfer of said information by periodically initiating a bit transfer period and assuming control of the data bus during a first portion of said period and relinquishing control of the data bus during the remaining portion of said period, said slave computer responsive to the initiation of said bit transfer period for reading the data bus during said first portion and thereafter assuming control of the data bus, said master computer reading the data bus during said remaining portion, said slave computer relinquishing control of the data bus prior to initiation of a succeeding bit transfer period, whereby a bit is transmitted from the master to the slave computer and a bit is transmitted from the slave to the master computer during each bit transfer period.

4,503,514
COMPACT HIGH SPEED HASHED ARRAY FOR DICTIONARY STORAGE AND LOOKUP

Robert J. Urquhart, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1981, Ser. No. 335,478
Int. Cl.³ G06F *5/00*
U.S. Cl. 364—900 **4 Claims**



1. A control system for controlling a text processing machine to verify the presence of an input character string in a dictionary of character strings comprising:

means for calculating a magnitude and angle representation for each of N dictionary character strings;

means for sorting said magnitude and angle representations into numerical order;

a memory buffer of 2N bit locations;

means for activating a binary bit of a first polarity in said memory buffer for each of the possible N magnitude representations;

means for calculating a modulo N value for each of the N magnitude representations;

means for activating a binary bit of a second polarity opposite said first polarity in said memory buffer adjacent each binary bit of said first polarity for each modulo N value calculated;

means for storing said angle representations corresponding to said calculated modulo N values;

means for receiving an input character string and calculating a magnitude and angle representation for said input character string;

means for calculating the modulo N value of the magnitude representation of said input character string;

means for scanning said memory buffer for binary bits of said second polarity adjacent said binary bit of said first polarity representing the modulo N value of the input character string magnitude representation;

means for synchronously scanning the corresponding angle representations;

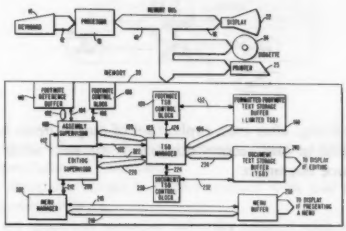
means for comparing all angle representations corresponding to the binary bit of said second polarity adjacent the binary bit of said first polarity corresponding to the modulo N value of the input word to the input word angle representation; and

means for outputting a signal indicating whether the compare is equal or not equal.

4,503,515
FOOTNOTE ASSEMBLY MANAGEMENT

Victor Cuan; Rex A. McCaskill, both of Austin; James T. Repass, Round Rock, and Kenneth O. Shipp, Jr., Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 17, 1982, Ser. No. 378,946
Int. Cl.³ G06F *9/00*
U.S. Cl. 364—900 **10 Claims**



1. A method of managing assembly of separately stored document body and footnote text for display review, with a keyboard/display system, of an assembled footnoted document, said method comprising:

(a) loading footnote text lines for a corresponding footnote into a footnote buffer following a counting by a counting means of

(1) body text lines up to a footnote reference point, and

(2) footnote text lines for said corresponding footnote, if said counted footnote text lines will fit within said footnote buffer; and

(b) loading said footnote text lines from said footnote buffer and counted body text lines, into a page buffer as long as all of said footnote lines will fit within said page buffer.

4,503,516
METHODOLOGY FOR TRANSFORMING A FIRST EDITABLE DOCUMENT FORM PREPARED BY AN INTERACTIVE TEXT PROCESSING SYSTEM TO A SECOND EDITABLE DOCUMENT FORM USABLE BY AN INTERACTIVE OR BATCH TEXT PROCESSING SYSTEM

Palmer W. Agnew, Owego; John J. Erhard, Binghamton, and Anne S. Kellerman, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1982, Ser. No. 442,827
Int. Cl.³ G06F *15/38, 15/21*
U.S. Cl. 364—900 **5 Claims**

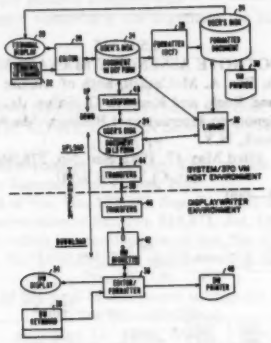
1. A method of transforming a source document, cast in a first editable form which includes a plurality of input items therein, to a target document of a second editable form which includes output items compatible therewith, said method comprising the steps of:

(a) determining a set of key state variables, from amongst all possible key state variables, that refers to and collectively identifies the status of said source document as represented by its data stream at any given point in said transformation;

(b) determining the actual number of possible key state combinations that can occur in any possible transformation;

(c) defining for each of said possible key states combination,

in combination with each of said input items, and explicit set of output items compatible with said second editable document form to be placed in said second document; and



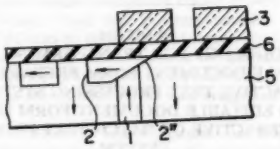
(d) defining, after each explicit set of output items has been placed in said second document, the next state of said source document.

4,503,517

MAGNETIC BUBBLE MEMORY DEVICE

Hiroshi Umezaki, Koganei; Naoki Koyama; Yooji Maruyama, both of Hachioji, and Yutaka Sugita, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 19, 1983, Ser. No. 543,422
Claims priority, application Japan, Oct. 20, 1982, 57-182850
Int. Cl.³ G11C *19/08*
U.S. Cl. 365—36 **4 Claims**



1. A magnetic bubble memory device comprising:

a layer of magnetic material which holds magnetic bubbles therein and in which the magnetic bubbles are propagated;

an ion-implanted region for bubble storage formed with a predetermined pattern in a surface of said magnetic material layer, a first bubble transfer means being defined by the edge of said ion-implanted region bounding a non-implanted region in said magnetic material layer; and

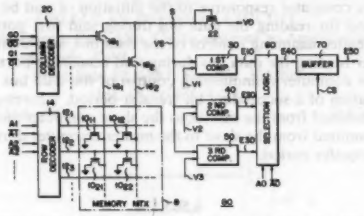
a second bubble transfer means of a permalloy formed with a predetermined pattern in vicinity of said first bubble transfer means for reading or writing the magnetic bubbles therefrom or therein, the ion implantation depth in a portion of said ion-implanted region in vicinity of said second bubble transfer means continuously changing so that it becomes shallower towards said second bubble transfer means and the edge of said portion of the ion-implanted region is inclined at a predetermined angle relative to a vertical direction.

4,503,518

SEMICONDUCTOR IC MEMORY

Hiroshi Iwahashi, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 21, 1981, Ser. No. 304,037
Claims priority, application Japan, Sep. 25, 1980, 55-133560
Int. Cl.³ G11C *11/40*
U.S. Cl. 365—104 **36 Claims**



33. A semiconductor IC memory comprising:

a matrix of transistor memory cells storing information represented by the gate threshold voltages of the respective memory cells, each of said memory cells having one of at least three different gate threshold voltage levels representative of three different storable data states;

address circuit means for activating a selected one of said memory cells to produce a read out signal representing the gate threshold voltage of said selected memory cell; and

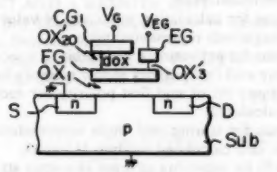
output means including at least two signal comparison circuits receiving said read out signal and generating comparison output signals identifying the gate threshold voltage level of said selected memory cell, said output means producing a digital output representing the data state stored in said selected memory cell, said digital output being generated while said read out signal is in a transient state.

4,503,519

SEMICONDUCTOR NON-VOLATILE MEMORY ELEMENT OF AN ELECTRICALLY ERASABLE TYPE

Hideki Arakawa, Yokohoma, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 19, 1982, Ser. No. 359,706
Claims priority, application Japan, Mar. 25, 1981, 56-43501
Int. Cl.³ G11C *11/40*
U.S. Cl. 365—104 **6 Claims**



1. A semiconductor non-volatile memory element of an electrically-erasable type, comprising:

a semiconductor substrate;

a first insulating film formed on said semiconductor substrate;

a floating gate comprising polycrystalline silicon, formed on said first insulating film, said floating gate being adapted to receive carriers injected from said semiconductor substrate during a writing operation, and to emit carriers during an erasing operation;

a second insulating film, formed on said floating gate by a thermal oxidation process, comprising an oxide film formed by thermal oxidation of said polycrystalline silicon in said floating gate, said second insulating film comprising first and second portions, said first portion having a thickness between 150 to 400 angstroms, the thickness being less than that of said second portion;

an erase-only gate formed on said first portion of said second insulating film, said erase-only gate being adapted to receive the carriers emitted from said floating gate during the erasing operation; and

a control gate formed on said second portion of said second insulating film.

4,503,520

ERASABLE FPLA

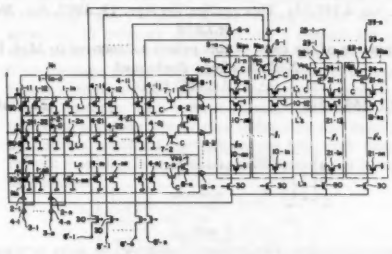
Mikio Kyomasu; Toshiyuki Araki, both of Toyono; Shinobu Fukunaga, Kawanishi, and Masahiro Shindo, Toyonaka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 16, 1982, Ser. No. 442,167

Claims priority, application Japan, Nov. 17, 1981, 56-185037

Int. Cl.³ G11C *11/40*

U.S. Cl. 365—177 **12 Claims**



1. A programmable logic array in which a desired logic function may be erasably programmed comprising:

a first matrix of conductors including a first plurality of horizontal conductors which may be selectively connected to a first reference voltage and a second plurality of vertical conductors extending in the direction normal to and electrically isolated from said horizontal conductors;

a plurality of input terminals each of which is connected to supply one binary state to the corresponding one of said vertical conductors of said first matrix and the other binary state to the other corresponding one of said vertical conductors of said first matrix;

a second matrix of conductors including a first plurality of horizontal conductors which may be operatively coupled to the corresponding selected ones of said horizontal conductors of said first matrix and a third plurality of vertical conductors extending in the direction normal to and electrically isolated from said horizontal conductors of said second matrix;

output terminals connected to receive output signals from the vertical conductors of said second matrix; and

a plurality of reprogrammable memory elements each disposed at the cross-over point between said horizontal and vertical conductors, each of said reprogrammable memory elements disposed in said first matrix having its first electrode connected to the corresponding vertical conductor, its second electrode connected to the corresponding horizontal conductor and its third electrode connected to a second reference voltage and each of said reprogrammable memory elements disposed in said second matrix having its first electrode connected to the corresponding horizontal conductor, its second electrode connected to the corresponding vertical conductor and its third electrode connected to said second reference voltage.

4,503,521

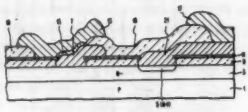
NON-VOLATILE MEMORY AND SWITCHING DEVICE

Jerome D. Schick, LaGrangeville, and Howard R. Wilson, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 25, 1982, Ser. No. 392,416

Int. Cl.³ G11C *11/40, 11/36*

U.S. Cl. 365—182 **13 Claims**



1. A non-volatile switch and memory device, comprising;

a semiconductor substrate;

first electrode means in ohmic contact with said semiconductor substrate;

second electrode means in Schottky contact with said semiconductor substrate forming a depletion region therein which acts as a conduction barrier to said first electrode means;

insulating means surrounding at least a portion of said Schottky contact and arranged to include a dual dielectric structure for entrapping positive charges therein in response to voltage means causing positive potential to be supplied therethrough to said substrate; and

voltage means including conductive control means deposited upon said insulating means surrounding at least a portion of said Schottky contact, said voltage means including gate electrode means for causing a positive potential to be supplied to said substrate and positive charges to be entrapped in said insulating means whereby said charges act to modify said depletion region to allow conduction between said first and second electrodes.

4,503,522

DYNAMIC TYPE SEMICONDUCTOR MONOLITHIC MEMORY

Jun Etoh; Yoshiki Kawajiri, both of Hachioji; Ryoichi Hori, Tokyo, and Kiyoo Itoh, Higashikurume, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 16, 1982, Ser. No. 358,678

Claims priority, application Japan, Mar. 17, 1981, 56-37706[U]; Apr. 17, 1981, 56-57142

Int. Cl.³ G11C *7/00, 11/40*

U.S. Cl. 365—203 **27 Claims**

1. A dynamic type semiconductor monolithic memory, comprising:

a plurality of word lines;

a plurality of data lines intersecting said word lines;

a plurality of memory cells each disposed at crossovers formed by said intersecting word lines and data lines for storing a charge therein, wherein a magnitude of said stored charge is dependent on a voltage level of the data line corresponding to the word line which is driven;

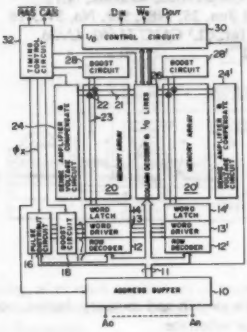
word line selecting means for selecting one of said word lines;

word line driving means for driving said selected word line for a predetermined period by boosting said selected word line to a first increased level and then to a second increased level by two separate boosting operations after

said selected word line has been set to a predetermined voltage;

means for precharging said plurality of data lines to a precharged voltage during said predetermined period;

sense amplifier means including means for discharging some data lines to a level lower than a predetermined level and for setting other data lines at a level higher than said



predetermined level during said predetermined period; and

voltage compensating means coupled to said data lines for increasing to a level higher than the precharged voltage a potential on those data lines whose potential has been set by said sense amplifier means to be higher than said predetermined level during said predetermined period.

4,503,523

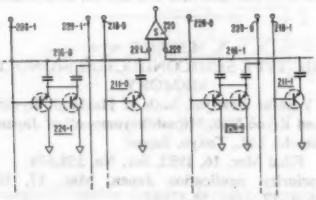
DYNAMIC REFERENCE POTENTIAL GENERATING CIRCUIT ARRANGEMENT

Joseph R. Cavaliere, Hopewell Jct., and Peter T. Liu, Hopewell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1982, Ser. No. 393,965

Int. Cl.[3] **G11C** *7/00, 11/24, 11/40*

U.S. Cl. 365—210 **4 Claims**



1. A dynamic reference potential generating circuit arrangement particularly for use in an electronic binary data storge array of the type having a multiple of cells, each comprising a transistor and a capacitor connected to word and digit lines to which differential sensing circuitry is attached,

said arrangement comprising,

a reference line,

a refresh line,

a point of fixed reference potential,

a pair of said transistors each having emitter, base and collector electrodes,

circuitry interconnecting said emitter electrodes,

circuitry connecting said base electrodes to said reference line,

circuitry connecting said collector electrodes to said point of fixed reference potential,

a pair of capacitors having given electrodes connected in common to said emitter electrodes and having one of said other electrodes connected to one of said digit lines, and

circuitry connecting the other of said other electrodes to said refresh line.

4,503,524

ELECTRICALLY ERASABLE DUAL-INJECTOR FLOATING GATE PROGRAMMABLE MEMORY DEVICE

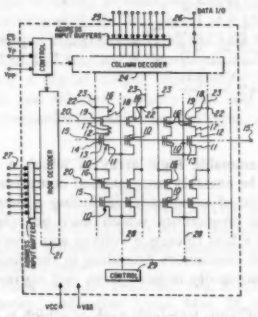
David J. McElroy, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 155,039, Jun. 2, 1980, Pat. No. 4,384,349, which is a continuation-in-part of Ser. No. 80,712, Oct. 1, 1979, Pat. No. 4,282,446, and Ser. No. 110,052, Jan. 7, 1980, Pat. No. 4,373,248, said Ser. No. 110,052, is a continuation-in-part of Ser. No. 923,876, Jul. 12, 1978, Pat. No. 4,184,007, which is a division of Ser. No. 762,613, Jan. 26, 1977, Pat. No. 4,151,021. This application Apr. 13, 1982, Ser. No. 367,838

The portion of the term of this patent subsequent to May 17, 2000, has been disclaimed.

Int. Cl.[3] **G11C** *13/00*

U.S. Cl. 365—218 **22 Claims**

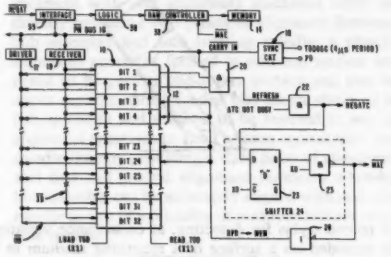


12. An electrically eraseable floating gate type memory array formed in a semiconductor substrate comprising: a plurality of first field-effect transistor devices each having a source, a drain, a floating gate, and a control gate, the floating gate being isolated from the channel between source and drain by thin insulator and the control gate being isolated from the floating gate by thin insulator; a plurality of second field-effect transistors devices each having a source, a drain and a gate, the gate being isolated from the channel between source and drain thin insulator; a memory cell being defined by one of the first transistors connected in series with one of the second transistors, the cells being arranged in an array of rows and columns, the drains of the second transistors being connected to elongated parallel column lines; means connecting the control gates of all of the first transistors in all rows together and to a terminal without connection to said substrate, means connecting the gates of all of the second transistors in a row together to provide row lines; means for applying high voltage of one polarity to a selected one of the column lines and a selected one of the row lines; means for applying a high voltage of opposite polarity to all of said control gates via said terminal; and means for applying a low voltage to row lines other than said selected row line.

4,503,525
COMMON CIRCUIT FOR DYNAMIC MEMORY REFRESH AND SYSTEM CLOCK FUNCTION

Ashgar K. Malik, Escondido, and John A. Celio, San Diego, both of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 7, 1982, Ser. No. 366,275
Int. Cl.³ G11C *7/00*
U.S. Cl. 365—222 **10 Claims**

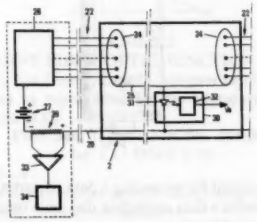


1. A circuit for refreshing a dynamic memory comprising:
a multi-stage binary counter for providing output bits corresponding to memory addresses and a cumulation count equivalent to the elapsed pulses of a systems clock, and
refresh message generating means operatively coupling said binary counter to said dynamic memory for generating a refresh message, said refresh message generating means including addressing means for addressing said memory at an address specified by said output bits such that said refresh meassage is applied at said address so as to refresh said memory.

4,503,526
DEVICE FOR WATER INFLOW DETECTION INSIDE A SEISMIC STREAMER

Claude Beaudocel, Henouville; Jacques Cretin, Le Chesnay; Alain Ausset, Le Vesinet, and Gabriel Ringot, Courbevoie, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison and Compagnie Generale de Geophysique, Massy, both of, France

Filed Jul. 2, 1982, Ser. No. 394,982
Claims priority, application France, Jul. 2, 1981, 81 13212
Int. Cl.³ G01V *1/38;* G01R *31/02*
U.S. Cl. 367—20 **8 Claims**

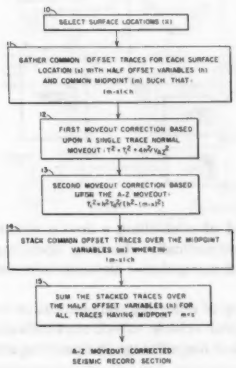


2. A device for detecting water leaks into a seismic streamer comprising a plurality of streamer sections interconnected by means of connection assemblies, said seismic streamer further comprising assemblies of seismic receivers, data electronic acquisition systems for collecting signals generated by the assemblies of seismic receivers, signal transmission lines for connection of the assemblies of seismic receivers to the acquisition systems and for the connection of the acqulsition systems to a control and recording assembly located on a vehicle towing the seismic streamer, and further comprising electric feeding lines connected to an electric power supply means for feeding said acquisition systems, said electric feeding lines and said transmission lines each comprising a plurality of line sections joined together by means of said connection assemblies, and said device constructed for detecting water leaks by produced parasitic electric currents between said electric feeding lines and said transmission lines, the device comprising DC voltage generating means, a plurality of detection assemblies corresponding to and respectively disposed in the plurality of connection assemblies, each of said detection assemblies having a closed circuit element surrounding the electric feeding line sections, a conducting line connected to said DC voltage generating means, detecting means for detecting any DC voltages between each closed circuit element and said conducting line resulting from parasitic connections between the electric feeding lines and said closed circuit element, with said detecting means comprising opto-electronic elements for generating auxiliary electric voltages in response to said detected DC voltages, and transmitting means for transmitting to the vehicle any detected electric voltages.

4,503,527
METHOD FOR ENHANCEMENT OF THE SIGNAL-TO-NOISE RATIO IN SEISMIC REFLECTION SIGNALS

Keh Pann, Richardson, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 248,173, Mar. 30, 1981, abandoned.
This application Feb. 9, 1984, Ser. No. 578,401
Int. Cl.³ G01V *1/36*
U.S. Cl. 367—53 **3 Claims**


SELECT SURFACE LOCATIONS (s)
GATHER COMMON OFFSET TRACES FOR EACH SURFACE LOCATION (s) WITH HALF OFFSET VARIABLES (h) AND COMMON MIDPOINT (m) SUCH THAT:
FIRST MOVEOUT CORRECTION BASED UPON A SINGLE TRACE NORMAL MOVEOUT:
SECOND MOVEOUT CORRECTION BASED UPON THE A-Z MOVEOUT:
STACK COMMON OFFSET TRACES OVER THE MIDPOINT VARIABLES (m) WHEREIN:
SUM THE STACKED TRACES OVER THE HALF OFFSET VARIABLES (h) FOR ALL TRACES HAVING MIDPOINT
A-Z MOVEOUT CORRECTED SEISMIC RECORD SECTION

1. In seismic exploration wherein seismic reflection signals are obtained from subsurface reflection geometry, the method of correcting said seismic reflection signals to zero source-to-receiver times comprising:
(a) gathering common offset seismic reflection signals into sets having the same half offset and a common midpoint
(b) moveout correcting the common offset gathered seismic signals in each of said common midpoint seismic gathers for the time differentials in the occurrence of the primary reflection signals between adjacent receivers along the line of exploration cause by normal moveout from horizontal subsurface reflectors
(c) moveout correcting the common offset gathered seismic signals in each of said common midpoint seismic gathers to compensate for the time differentials in the occurrence of the primary reflection signals between adjacent receivers along the line of exploration caused by subsurface dipping and diffraction events, whereby arbitrary source-to-receiver seismic reflection signals are moveout corrected to zero source-to-receiver seismic signals.

(d) stacking the common offset moveout corrected seismic reflection signals over the midpoint variables, and

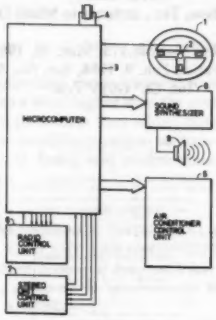
(e) summing said stacked common offset moveout corrected seismic reflection signals over the offset variables for each midpoint to produce a common offset seismic record section in which the subsurface dipping and diffraction events are stacked with a dip independent velocity parameter, thereby providing a common offset seismic record section improved in signal-to-noise ratio.

4,503,528

METHOD AND APPARATUS FOR CONTROLLING VEHICLE MOUNTED DEVICES AND EQUIPMENT

Tadao Nojiri, Obu; Kenji Kanamaru; Masahiro Matsuyama, both of Chiryu; Takayoshi Nishikawa, and Yoji Ito, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 2, 1982, Ser. No. 354,045
Claims priority, application Japan, Mar. 5, 1981, 56-32166
Int. Cl.³ H04Q *9/00*; B60Q *1/00*; H04B *1/46*; G10L *1/04*
U.S. Cl. 367—198 **35 Claims**



1. A method of controlling a device mounted on a motor vehicle for automatically changing operating conditions of first and second manipulative elements inherent to said device, comprising:

(a) a first step of detecting start-indication from a passenger of said motor vehicle, which start-indication is indicative of a demand for a change in operating conditions of said device;

(b) a second step of emitting vocal announcement indicative of said first manipulative element to compartment of said motor vehicle in response to said detection in said first step;

(c) a third step of determining whether instructions from said operator responding to said vocal announcement of said second step is received within a predetermined period of time after said vocal announcement of said second step;

(d) a fourth step of changing the operating condition of said first manipulative element when said instructions are received at said third step;

(e) a fifth step of emitting vocal announcement indicative of said second manipulative element to said compartment when said instructions are not received at said third step;

(f) a sixth step of determining whether instructions from said operator responding to said vocal announcement of said fifth step is received within a predetermined period of time after said vocal announcement of said fifth step;

(g) a seventh step of changing the operating condition of said second manipulative element when said instructions are received at said fifth step.

4,503,529

RECORD STYLUS FOR CAPACITANCE DISKS

Yoshiyo Wada; Kunio Goto, both of Yokohama, and Hideaki Takehara, Fujisawa, all of Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Mar. 12, 1982, Ser. No. 357,355
Claims priority, application Japan, Mar. 13, 1981, 56-36952
Int. Cl.³ G11B *9/06*
U.S. Cl. 369—126 **8 Claims**

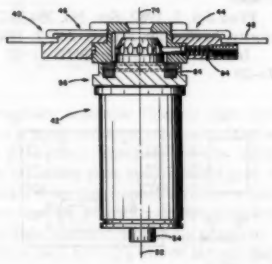
1. A record stylus for detecting, as capacitance variations, signals recorded on a surface of a recording medium in the form of minute pits along spiral or concentric tracks by generating a high-frequency electric field between the stylus and the recording medium, comprising a body of a hard, insulative material having a bottom face parallel to the surface of the recording medium and a rear face which is inclined forwardly from a perpendicular to the recording medium surface, and an electrode attached to said rear face and extending from said bottom face toward an upward end of the stylus, said electrode being applied, when in use, with a high-frequency potential with respect to said recording medium to generate said field.

4,503,530

DISK HUB SPINDLE SYSTEM

Sigmund Hinlein, Sudbury, and Shyam C. Parikh, Stow, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed May 27, 1982, Ser. No. 382,550
Int. Cl.³ G11B *3/70, 5/82*
U.S. Cl. 369—270 **3 Claims**



1. An arrangement for mounting a data recording hub assembly, which includes a data recording disk on a rotatable spindle comprising in combination:

rotatable spindle means having an axis of rotation and having a top section whose upper portion is formed to be conical in shape and whose lower portion is formed to have an outer surface which lies parallel to said axis of rotation and which is characterized by being an accurately machined surface; said rotatable spindle means further formed to provide a shoulder section extending from said lower portion of said top section, said shoulder section formed to support and secure a hub assembly so that if said rotatable spindle means rotates it will cause said hub assembly to rotate; hub assembly means formed to have a mounting

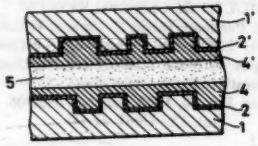
aperture therein, said mounting aperture having an inside wall with the periphery thereof formed to provide first and second alignment segments disposed apart from one another, said mounting aperture being further formed to have a depth dimension which is greater than the distance from said shoulder section to the top of said top section whereby when said hub is fitted over said top section said mounting aperture accepts said top section completely and said first and second alignment segments come into abutment with said accurately machined outer surface thereby providing two points of alignment between said hub assembly and said rotating spindle; a plurality of alignment apertures formed in said top section and disposed to be part in said lower portion and part in said upper portion; spring loaded bias means disposed in said hub assembly and adapted to be inserted in any of said alignment apertures to exert a force against said rotatable spindle thereby providing a third point of alignment with said first and second alignment segments whereby said hub assembly can be accurately aligned with said rotatable spindle in any of a plurality of positions around said rotatable spindle.

4,503,531

OPTICAL DISC

Hiroshi Kato, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 8, 1982, Ser. No. 447,853
Claims priority, application Japan, Dec. 22, 1981, 56-206078
Int. Cl.³ G11B 7/24
U.S. Cl. 369—275 **7 Claims**



1. An optical disc, comprising: a pair of substrates, at least one of which having predetermined information pits formed on one surface, said two substrates being bonded with a hot-melt adhesive having (1) a softening point of not more than 140° C., (2) a dry tensile adhesive strength of not less than 1 kg/cm^2 at 20° C. and (3) a melt viscosity of not more than 1,000 P at 160° C.

4,503,532

MULTIPOINT FIBER OPTIC JUNCTION TERMINAL

Michel Page, Lon Guevil, Canada, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 7, 1982, Ser. No. 386,000
Int. Cl.³ H04B 9/00
U.S. Cl. 370—1 **5 Claims**

1. An aircraft intercom system comprising:

a plurality L of radio transmitters;

a plurality M of radio receivers;

a plurality N of intercom control sets;

first multiplexing means, having a plurality M of inputs connected to receive respective first audio signals from said radio receivers, for sampling said first audio signals and forming therefrom a first multiplexed signal including a first synchronization signal and said first audio signal samples;

first clocking means for controlling the operation of said first multiplexing means and generating said first synchronization signal;

first modulating means, connected to receive said first multiplexed signal, for converting said first multiplexed signal into a first optical signal;

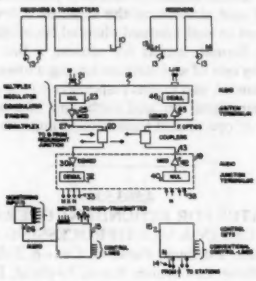
a first fiber optic line, having one end coupled to receive said first optical signal;

first demodulating means, coupled to an opposite end of said first fiber optic line to receive said first optical signal, for converting said first optical signal back into said first multiplexed signal;

first demultiplexing means, connected to receive said first multiplexed signal from said first demodulating means and including a plurality M×N of audio outputs connected to said control sets, for converting said first multiplexed signal back into said first audio signals to allow each first audio to be supplied to each control set;

first synchronizing means for detecting said first synchronization signal and controlling the operation of said first demultiplexing means in synchronism with the operation of said first multiplexing means;

second multiplexing means, having a plurality N of inputs connected to receive respective second audio signals from said control sets, for sampling said second audio signals and forming therefrom a second multiplexed signal including a second synchronization signal and said second audio signal samples;



second clocking means for controlling the operation of said second multiplexing means and generating said second synchronization signal;

second modulating means, connected to receive said second multiplexed signal, for converting said second multiplexed signal into a second optical signal;

a second fiber optic line, having one end coupled to receive said second optical signal;

second demodulating means, coupled to an opposite end of said second fiber optic line to receive said second optical signal, for converting said second optical signal back into said second multiplexed signal;

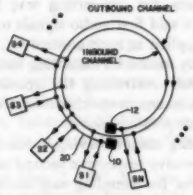
second demultiplexing means, connected to receive said second multiplexed signal from said second demodulating means and including a plurality L×N of audio outputs connected to said radio transmitters, for converting said second multiplexed signal back into said second audio signals to allow each second audio signal to be supplied to each radio transmitter; and

second synchronizing means for detecting said second synchronization signal and controlling the operation of said second demultiplexing means in synchronism with the operation of said second multiplexing means.

4,503,533
LOCAL AREA COMMUNICATION NETWORK UTILIZING A ROUND ROBIN ACCESS SCHEME WITH IMPROVED CHANNEL UTILIZATION

Found A. Tobagi, Los Altos, Calif.; Luigi Fratta, Segrate, and Flaminio Borgonovo, Cantù, both of Italy, assignors to Stanford University, Palo Alto, Calif.

Filed Aug. 20, 1981, Ser. No. 294,745
Int. Cl.³ H04J 6/00
U.S. Cl. 370—85 **66 Claims**

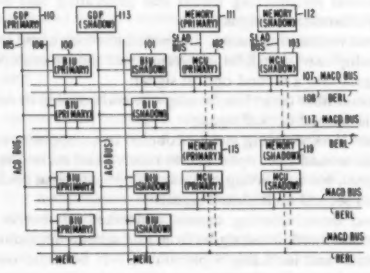


49. A local area communication network comprising a communication bus having an inbound channel and an outbound channel, a plurality of stations S1–SN located along and connected to said bus where each of said stations have a respective index corresponding to the locations of its connection to said bus, each of said stations including means for transmitting and receiving carrier signals having data packets on said bus in a round robin format such that said data packets are propagated past each of said stations in the same direction on said outbound channel to said inbound channel thereby achieving said round robin format, means for sensing a first carrier signal transmitted by one of said stations having a lower index on said outbound channel, and means responsive to the detection of an end of carrier signal on said outbound channel for starting transmission of one of said transmission units on said outbound channel.

4,503,534
APPARATUS FOR REDUNDANT OPERATION OF MODULES IN A MULTIPROCESSING SYSTEM

David L. Budde, Portland; David G. Carson, Hillsboro, both of Oreg.; Anthony L. Cornish, Essex, England; David B. Johnson, and Craig B. Peterson, both of Portland, Oreg., assignors to Intel Corporation, Santa Clara, Calif.

Filed Jun. 30, 1982, Ser. No. 393,905
Int. Cl.³ G06F 11/00
U.S. Cl. 371—9 **7 Claims**



1. For use in a data processing system in which a number of intelligent nodes are provided in a matrix composed of processor buses with corresponding error-reporting and control lines, and memory buses with corresponding error-reporting and control lines, wherein each node has means for logging errors and reporting errors on said error-report lines, wherein a primary module is connected to a primary node which controls access to a common memory bus, and wherein a shadow module is connected to a shadow node which controls access to said common memory bus, the combination in each of said primary and shadow nodes comprising:

shadow bit means settable to a first state and to a second state;

first logic means connected to said processor bus lines for receiving data destined for said common memory bus,

said first logic means including means for seting said shadow bit means and said married bit means;

married bit means operative when set to a first state for marrying said primary module and said shadow module in a primary/shadow pair such that each module in said primary/shadow pair is activated to receive data directed to said primary/shadow pair; and,

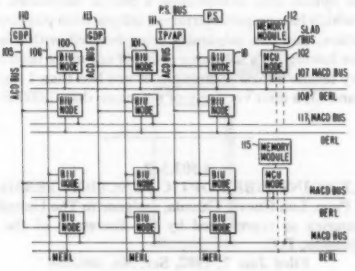
second logic means responsive to said shadow bit means and to said married bit means for causing said primary module to be active for at least the first bus transaction and passive for other predetermined bus transactions upon the condition that said shadow bit means is set to said first state and said married bit is set to said first state,

said logic means including means for causing said primary module to be passive for the first bus transaction and active for other predetermined bus transactions upon the condition that said shadow bit means is set to said second state and said married bit is set to said second state, such that each module in said primary/shadow pair alternates with the other module in the handling of a predetermined number of memory bus transactions.

4,503,535
APPARATUS FOR RECOVERY FROM FAILURES IN A MULTIPROCESSING SYSTEM

David L. Budde, Portland; David G. Carson, Hillsboro, both of Oreg.; Anthony L. Cornish, Essex, England; David B. Johnson, and Craig B. Peterson, both of Portland, Oreg., assignors to Intel Corporation, Santa Clara, Calif.

Filed Jun. 30, 1982, Ser. No. 393,906
Int. Cl.³ G06F 11/00
U.S. Cl. 371—11 **6 Claims**



1. In a data processing system including, a number of bus interface unit (BIU) nodes and memory control unit (MCU) nodes and in which a switching matrix provides electrical interconnections between horizontal MACD buses and vertical ACD buses connected in said matrix by means of said BIU nodes located at the intersections of said MACD and ACD busses, said memory control unit (MCU) nodes connected to said MACD busses,

means for detecting an error,

an error-reporting matrix including horizontal Bus Error Report Lines (BERLs) and vertical Module Error Report Lines (MERLs),

said BERLs being associated with said MACD buses such that all BIU and MCU nodes sharing an MACD bus are connected with a pair of BERLs,

said MERLs being associated with said ACD buses such that all nodes sharing an ACD bus are connected with a MERL, and,

error-reporting means in a particular node connected to said means for detecting an error,

said error-reporting means including means for receiving error messages transmitted over at least said one BERL, and means for reporting error messages over at least said one BERL, said error messages identifying the type of error and the locations (ID) at which the error was detected, a recovery mechanism in said particular node comprising:

a recovery machine;

said recovery machine including first means for causing said particular node to become quiescent for a first timeout period to thereby wait for transients to subside, said first means including means for disabling the reporting of errors by said error-reporting means for the duration of said first timeout period;

said recovery machine including second means for causing said particular node to enter a second timeout period;

means for storing memory accesses;

means for generating memory accesses;

means connected to said second means, operative during said second timeout period, for retrying a memory access stored in said storing means;

permanent error determining means connected to said means for detecting an error, to said recovery means, and to said error reporting means, operative upon the condition that an error recurs during said second timeout period, for causing said error-reporting means in said particular node to propagate a permanent-error error report message, said error message identifying the type of error and the location (ID) at which the permanent error was detected; and,

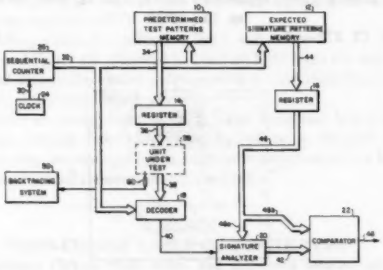
error report logging means in said particular node connected to at least one of said error report lines, for logging received error report messages propagated to said particular node.

4,503,536

DIGITAL CIRCUIT UNIT TESTING SYSTEM UTILIZING SIGNATURE ANALYSIS

Gary W. Panzer, Alta Loma, Calif., assignor to General Dynamics, Pomona, Calif.

Filed Sep. 13, 1982, Ser. No. 417,798
Int. Cl.³ G06F *11/00*; G01R *31/28*
U.S. Cl. 371—25 **7 Claims**



1. A system for testing digital circuit units at the design speed of the circuit units, comprising

a first memory for storing a computer generated minimized set of optimum predetermined test patterns for application to a unit under test;

a second memory for storing computer generated expected signature patterns which correspond to signature patterns that would be derived from a properly functioning unit under test in response to the predetermined test patterns;

a signature analyzer for deriving signature patterns from a unit under test in response to the application of said test patterns to said unit;

a comparator for comparing said derived signature patterns with said expected signature patterns and for providing an indication of the results of said comparison; and

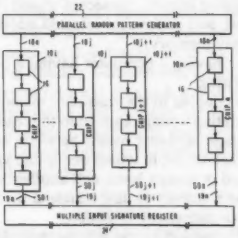
means for addressing the first and second memories, the address means for addressing the first memory so as to apply said test patterns to said unit under test at a speed that corresponds to the design speed of the unit under test and the address means for addressing the second memory so as to apply said expected signature patterns to said comparator.

4,503,537

PARALLEL PATH SELF-TESTING SYSTEM

William H. McAnney, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 8, 1982, Ser. No. 440,065
Int. Cl.³ G06F *11/00*
U.S. Cl. 371—25 **3 Claims**



1. In a combinational and sequential logic circuit arranged on a plurality of logic units with memory circuits on each logic unit coupled together to form a shift register which shift register can be enabled to provide a shift register scan path for testing the logic circuit and disabled while the logic circuit is performing its designed logic function, apparatus for performing self-testing of the logic circuit using a multistage generator means to generate testing sequences for the self-testing and a multistage data compression means to compress the response of the logic circuits the improvement comprising:

test circuit unit means containing the multistage random signal generator means for the generation of testing sequences and the multistage data compression means for the compression of the logic signals,

circuit means coupling the scan paths of said logic units to said test circuit unit means and,

logic means for coupling said shift register scan paths of said logic units in a plurality of parallel shift register paths between different stages of said signal generator means and said multistage data compression means for supplying said testing sequences to said memory circuits in said plurality of parallel paths so the response of said logic circuits is transmitted along said plurality of parallel paths to be compressed by said multistage data compression means for developing a self-test signature.

4,503,538

METHOD AND SYSTEM TO RECOGNIZE CHANGE IN THE STORAGE CHARACTERISTICS OF A PROGRAMMABLE MEMORY

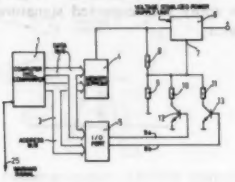
Eberhard Fritz, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 21, 1982, Ser. No. 390,291

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1981, 3134995

Int. Cl.³ G01R *31/28*

U.S. Cl. 371—28 **14 Claims**



8. In combination with a read-only memory (ROM), especially an erasable programmable read-only memory (EPROM),

an incipient error recognition sytem to recognize change in the storage characteristics of memory cells in the read-only memory (ROM) element (4) having

a voltage applying means to apply operating voltage to the memory element;

a computer (1) capable of sequentially generating read-out or interrogating signals, connected to said read-only memory element, and addressing selected addressable cells in the read-only memory,

said computer having a computer having a computer memory, comprising

means (8–13) coupled to the read-only memory for controlling an operating voltage applied to the read-only memory by the voltage applying means between at least two selected voltage levels, in which one of the voltage levels is at a standard or design level, and another voltage level is changed with respect to said standard or design level in increasing or decreasing direction;

and means (5) coupled to the voltage applying means connected to and controlled by the computer (1) for reading-out the memory of said read-only memory at

(a) the standard or design voltage; and, also

(b) at another voltage level;

the computer memory being connected for storing the content of the read-only memory during read-out of the content at said standard or design level;

said computer further including a comparator, the comparator being connected to and controlled by said selective voltage applying means (5) and connected to compare the stored memory content in the computer memory with the content of the read-only memory (ROM) being read out at said other voltage level,

wherein said computer (1) provides sequentially generated read-out command signals, and the memory element, or cells thereof are addressable by the computer;

said computer controlling

reading-out a first time the memory content of addressed cells of the read-only memory element with a standard or design read-out voltage;

storing the memory content of the cells of the read-only memory element, as read out the first time, in a computer memory;

reading-out a second time the memory content of said previously addressed cells of the read-only memory with a read-out voltage which differes from said standard or design read-out voltage;

comparing the content stored in the computer memory, as read out the first time, with the data derived from the cells of the memory element as read-out said second time;

and generating an error signal upon non-concurrence of the data derived from the read-only memory element as read out the second time with the content of the computer memory.

4,503,539

SEMICONDUCTOR LASER

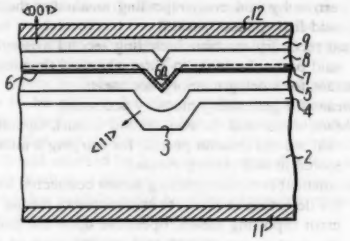
Yoshifumi Mori, and Osamu Matsuda, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 283,536, Jul. 15, 1981, abandoned. This application Apr. 13, 1984, Ser. No. 599,224

Claims priority, application Japan, Jul. 16, 1980, 55-97398

Int. Cl.³ H01S *3/19*

U.S. Cl. 372—45 **4 Claims**



1. In a semiconductor laser comprising: a planar semiconductor substrate having an elongated groove with slanting planar surfaces in one of its planar surfaces, a semiconductor active layer formed on said one planar surface, an active region aligned with said groove and having planar surfaces parallel to the slanting planar surfaces of said elongated groove, a pair of semiconductor layers sandwiching said active layer and having wider energy gaps than said active layer, and a p-n junction having a first part adjacent said active region and a second part in one of said pair of semiconductor layers.

4,503,540

PHASE-LOCKED SEMICONDUCTOR LASER DEVICE

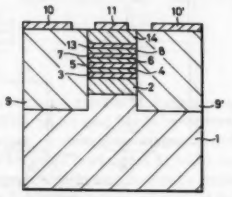
Hisao Nakashima, Tokorozawa; Jun-ichi Umeda, Hachioji; Takao Kuroda, Kokubunji; Takashi Kajimura, and Hiroshi Matsuda, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 14, 1982, Ser. No. 368,150

Claims priority, application Japan, Apr. 22, 1981, 56-59851

Int. Cl.³ H01S *3/19*

U.S. Cl. 372—47 **4 Claims**



1. A semiconductor laser device comprising:

a. a laminated structure with a top, bottom and two side faces which are parallel to each other and to the direction of a laser beam to be generated by said device having:

i. a plurality of first semiconductor layers having substantially the same composition;

ii. a plurality of second semiconductor layers having a wider band gap and a lower refractive index than said plurality of first semiconductor layers;

iii. said first and second semiconductor layers stacked such that said first semiconductor layers are sandwiched between said second semiconductor layers;

b. third semiconductor layers disposed adjacent said side faces, each third semiconductor layer in contact with a respective one of said side faces thereby forming interfaces with said first semiconductor layers, said third semiconductor layers having a band gap which is not narrower than the band gap of said first semiconductor layers and a refractive index which is not higher than the refractive index of said first semiconductor layers, the conductivity type of said third semiconductor layers not being the same as that of said first semiconductor layers;

c. means to inject current into said interfaces between said first semiconductor layers and said third semiconductor layers; and

d. means acting as an optical resonator for said laser beam.

4,503,541

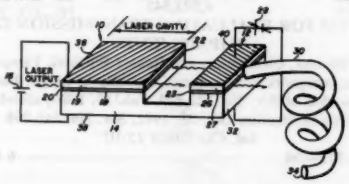
CONTROLLED-LINEWIDTH LASER SOURCE

Joseph F. Weller, Ft. Washington, Md., and Lew Goldberg, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 10, 1982, Ser. No. 440,685

Int. Cl.³ H01S 3/19

U.S. Cl. 372—50 **11 Claims**



1. A controlled-linewidth laser diode source comprising:

a semiconductor laser diode with a laser active region with partially reflecting first and second facets at two opposing ends thereof to form a laser cavity,

a laser biasing circuit for biasing said laser diode into conduction;

an electroabsorption cell with an absorption active region with a third facet on a cell wall closest to said laser diode second facet;

a first light path disposed between said laser diode second facet and said electroabsorption cell third facet for conducting light passing through said facets therebetween;

an electroabsorption cell bias circuit for biasing said electroabsorption cell;

reflecting means for reflecting light; and

a second light path disposed to conduct light from the end of said electroabsorption cell opposite to said third facet to said reflecting means;

wherein an output light signal is taken from said first facet and wherein linewidth variation thereof is obtained by varying the bias applied by said electroabsorption cell bias circuit to said electroabsorption cell.

4,503,542

HIGH-ENERGY LASER OF THE TE-TYPE

Hans-Jürgen Cirkel; Willi Bette, and Reinhard Müller, all of Erlangen, Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

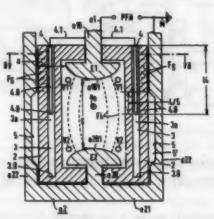
Filed Jul. 2, 1982, Ser. No. 394,682

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1981, 3126375

Int. Cl.³ H01S 3/097

U.S. Cl. 372—58 **9 Claims**

1. In a high-energy laser of the TE-type with excitation taking place by an arc-free capacitor discharge being as homogeneous as possible, the improvement comprising a housing having walls formed at least partially of high voltage-resistant insulating material defining a laser chamber having a gas space, at least two first and second electrodes being extended in said laser chamber and surrounded by regions of said housing walls, said electrodes being disposed opposite each other, spaced apart and parallel to the optical axis of the laser, the excitation taking place in said gas space between said electrodes, a preionization device disposed in said laser chamber, a current feed connected to said first electrode, a current return being connected to said second electrode and being in the form of metallic wall portions extended from said second electrode along the outside of said housing of said laser chamber at least to the vicinity of the region of said housing wall surrounding said first electrode, said insulating material of said housing in said



gas space between said electrodes and said wall portions of said current return having cavities formed therein on two sides of said first electrode parallel to the optical axis, as seen in direction of the optical axis, shield electrodes being inserted into said cavities and being connected to the potential of said first electrode, said housing of said laser chamber and said current return having lateral window-shaped cutouts formed therein for permitting a laser gas flow transverse to the optical axis and forming remaining housing wall elements with a core in which said metallic current return is disposed, a first layer of insulating material surrounding said metallic current return in said core, said first insulating layer being enclosed by said shield electrodes, and a second layer of insulating material encapsulating said shield electrodes.

4,503,543

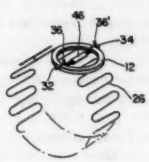
RING LASER GYROSCOPE GETTER-HOLDER

Bo H. G. Ljung, Wayne, and John C. Stiles, Morris Plains, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Jul. 16, 1982, Ser. No. 399,046

Int. Cl.³ H01S 3/083

U.S. Cl. 372—94 **8 Claims**



1. In a ring laser gyroscope, a getter-holder comprising:

a resilient member having outer ends and contoured in a generally ring shaped configuration;

the ends of the member formed to contact two points of a getter;

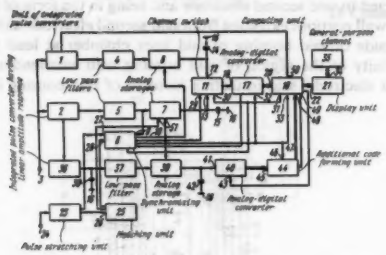
means mating with the member ends for clamping the contacted getter points therebetween; and

means encircling the mating means, a median section of the resilient member, and the ends of the member for retaining clamping action of the getter.

4,503,544
DEVICE FOR PULSE MEASUREMENT AND CONVERSION

Rafail M. Musin, studenchesky gorodok, 15, kv. 13; Mikhail I. Gryaznov, ulitsa Omskaya, 12, kv. 26, and Dmitry A. Timofeev, pereulok Tkacheva, 4, kv. 3, all of Gorky, U.S.S.R.

Filed Jan. 24, 1983, Ser. No. 460,375
Int. Cl.³ G01R *19/16*
U.S. Cl. 375—10 **4 Claims**



1. A device for pulse measurement and conversion and for delivery of converted pulses to a general purpose channel, comprising:

a first integrated pulse converter having linear amplitude response and a second integrated pulse converter unit comprising two integrated pulse converters having nonlinear amplitude responses, allowing for stretching of input pulses to obtain an amplitude of stretched pulses which is a linear function of the duration of pulses and, respectively, a quadratic or linear function of the amplitude of input pulses said second integrated pulse converter unit having an input, a first output, and a second output, and said first integrated pulse converter having an input, and an output, said inputs of said first and second integrated pulse converters being joined together and forming a first input of the device for measurement and conversion of pulses;

a synchronizing unit forming control and synchronizing signals for the operation of the device for measurement and conversion of pulses and having a first output, a second output, a third output, a fourth output, a first input and a second input; and

a system for processing converted pulses, comprising:

a first low pass filter and a second low pass filter filtering low frequency noises in the signal transmitting channel an input of said first low pass filter being connected to said first output of said second integrated pulse converter, an input of said second low pass filter being connected to said output of said first integrated pulse converter, said first low pass filter having an output and said second low pass filter having an output connected to said first input of said synchronizing unit;

a first analog storage and a second analog storage converting pulsed voltages into quasi-constant voltages, a first input of said first analog storage being connected to said output of said first low pass filter, a first input of said second analog storage being connected to said output of said second low pass filter, second inputs of said first and second analog storages being connected to said first output of said synchronizing unit, said first and second analog storages each having an output;

a first capacitor and a second capacitor respectively connected to said outputs of said first and second analog storages;

a first analog-digital converter having a first input, a second input, a first output and a second output, said second input of said first analog-digital converter being connected to said third output of said synchronizing unit and said first output of said first analog-digital converter being connected to said second input of said synchronizing unit;

a channel switch alternating connection of analog signals to said analog-digital converter and having a first input, a second input, a third input, a fourth input and an output, said output of said first analog storage being connected to said first capacitor and to said first input of said channel switch, said output of said second analog storage being connected to said second capacitor and to said second input of said channel switch, said third input of said channel switch being connected to said second output of said synchronizing unit, said fourth input of said channel switch being connected to said fourth output of said synchronizing unit, said first input of said first analog-digital converter being connected to said output of said channel switch;

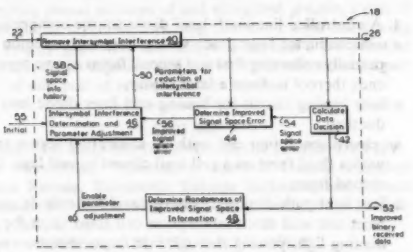
a computing unit performing arithmetic and logical operations with converted quantities, and having input connected, via a first data bus, to said second output of said first analog-digital converter, second and third inputs connected to said fourth and third outputs of said synchronizing unit, respectively, a fourth input connected to said second output of said second integrated pulse converter, fifth and sixth inputs and a first output;

a display unit having an input connected, via a second data bus, to said first output of said computing unit, and an output connected by a third data bus, to a general-purpose channel.

4,503,545
SYSTEM FOR EVALUATING TRANSMISSION LINE IMPAIRMENTS

Gordon Bremer, Clearwater, and Robert Wachtel, Tampa, both of Fla., assignors to Paradyne Corporation, Largo, Fla.

Continuation of Ser. No. 122,329, Feb. 19, 1980, abandoned. This application Oct. 28, 1981, Ser. No. 316,098
Int. Cl.³ H04B *15/02*
U.S. Cl. 375—34 **6 Claims**



1. In a data communication system employing QAM or PSK modulation and including a transmitter capable of transmitting a communication signal and a receiver capable of receiving the communication signal transmitted from the transmitter and generate a signal space pattern corresponding to the received communication signal wherein each point is defined in a coordinate system in which a first axis is the in-phase channel axis and a second axis is the quadrature channel axis, the improvement comprising calculating means for receiving signal space pattern information corresponding to the communication signal received and generating improved signal space pattern information, with said calculating means comprising:

first means having means receiving said signal space pattern information and adjusting said signal space pattern information in accordance with adjustment parameters for reducing intersymbol interference and generating improved signal space pattern information;

second means coupled to said first means for receiving said improved signal space pattern information therefrom having decision means reviewing the improved signal space pattern information and determining what communication signal was transmitted and generating signal space pattern information corresponding to the transmitted communication signal;

third means coupled to said first and second means and including means for receiving and comparing said improved signal space pattern information and the signal space pattern information corresponding to the transmitted communication signal and generating error signal based upon the comparison of said signals;

fourth means coupled to said third means to receive said error signal; means capable of generating a space pattern information history corresponding to signal space pattern information received by the calculating means and conveying it to said fourth means which receive said signal space pattern information history, said fourth means being capable of generating said adjustment parameters based upon its comparison of the error signal and the signal space pattern information history so as to successively reduce intersymbol interference in the improved signal space pattern information.

4,503,546

PULSE SIGNAL TRANSMISSION SYSTEM

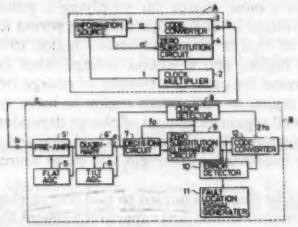
Hiroki Yoshine, Machida; Yoshitaka Takasaki, Tokorozawa; Yasushi Takahashi, Hachioji; Mitsuo Yamada, Ohme, and Katsuyuki Nagano, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 1, 1983, Ser. No. 471,128

Claims priority, application Japan, Mar. 19, 1982, 57-42763

Int. Cl.³ H03K *13/02*

U.S. Cl. 375—37 **31 Claims**



1. A code signal transmission system comprising a transmitting circuit portion and a receiving circuit portion interconnected by a transmission line; said transmitting circuit portion including code converter means for converting a binary information signal of "1" and "0" levels into a coded pulse signal in which one code has its polarity inverted at a first fixed period T and the other code has its polarity inverted at a second fixed period of one-half T, zero succession detection means for detecting a predetermined number of successive "0's" in said binary information signal, and zero substitution means responsive to said zero succession detection means for controlling said code converter means to replace said succession of "0's" with a recognizable signal portion formed by a pulse train including two-level codes of level "1" in-phase with or anti-phase to the "0" values of said binary information signal; and said receiving circuit portion including means connected to receive a coded signal from said transmission line for subjecting said coded signal to duo-binary shaping to produce a duo-binary shaped signal of the three levels "+1", "0" and "−1", regenerating means for regenerating a binary information signal from said duo-binary shaped signal, zero substitution detection means for detecting said recognizable signal portion from the in-phase or anti-phase pulse arrangement of said duo-binary shaped signal, zero substitution elimination means responsive to said zero substitution detection means for converting said recognizable signal portion to a succession of "0's", and clock detector means responsive to said duo-binary shaped signal for generating a clock signal to control said regenerating means.

4,503,547

ELECTRICAL DATA PULSE PROCESSING

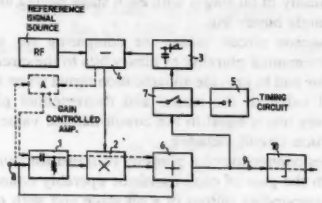
Christopher P. Summers, London, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 15, 1982, Ser. No. 441,697

Claims priority, application United Kingdom, Dec. 4, 1981, 8136613

Int. Cl.³ H04N *5/14*

U.S. Cl. 375—76 **6 Claims**



1. A circuit arrangement for improving the shape of a data pulse waveform which is composed of data pulses that occur in a serial bit stream and are arranged in successive bursts of which each comprises a sequence of clock run-in pulses followed by a sequence of code pulses; which circuit arrangement comprises a high-pass filter for receiving said data pulse waveform and operable as a differentiator to separate high frequency components of that waveform from the remainder thereof, these separated high frequency components forming an auxiliary waveform, and a combining circuit coupled to said high-pass filter for receiving said auxiliary waveform as well as said data pulse waveform and operable to produce as an output of said circuit arrangement a resultant pulse waveform; characterized in that said circuit arrangement further comprises control means coupled to the output of said combining circuit to receive the resultant pulse waveform and for producing an amplitude correcting signal which, for each data pulse burst, is adjusted to a value which is a function of the mean peak-to-peak amplitude of the sequence of clock run-in pulses in the data pulse burst, and gain control means responsive to said amplitude correcting signal for adjusting the amplitude of said auxiliary waveform for the following sequence of code pulses in the data pulse burst.

4,503,548

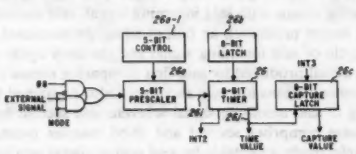
TIMER WITH FAST COUNTER INTERRUPT

Jesse C. Phillips, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 5, 1982, Ser. No. 365,824

Int. Cl.³ H03K *21/14*; **G06M** *3/02*

U.S. Cl. 377—39 **3 Claims**



1. A timer comprising:

a multiple bit storage means for storing a numerical value as a plurality of binary bits;

potential means representing a circuit defined value;

an evaluation means for providing an output signal when the numerical value of the multiple bit storage means is equal to the circuit defined value, the evaluation means further comprises:

a counter means for storing the plurality of binary bit and to periodically decrement, at a predetermined rate, the stored plurality of binary bits, the counter means having a plurality of bit stages with each stage having an output of a single binary bit;

comparison circuit means for comparing the stored and decremented plurality of binary bits to the circuit defined value and to provide an indication signal when the numerical value of the stored and decremented plurality of binary bits is equal to the circuit defined value, the comparison circuit includes;

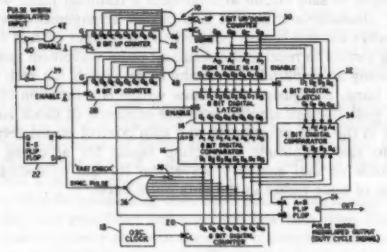
a series connection of a plurality of transistor switch means with the gate of each transistor operably connected to a corresponding output of a bit stage and with one end of the series connection being connected to the potential means and the other end being the indicating signal output.

4,503,549

INTERPOLATING FUNCTION GENERATOR FOR TRANSMITTER SQUARE ROOT EXTRACTION

Chet J. Slabinski, Chagrin Falls, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Jul. 16, 1982, Ser. No. 399,154
Int. Cl.³ G06G 7/20; G06F 7/38, 7/62
U.S. Cl. 377—49 **9 Claims**



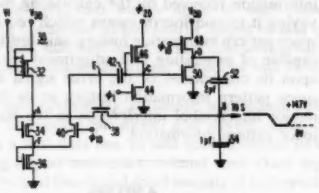
1. A function generator for producing a function of an incoming signal comprising memory means containing values relating to the desired function of said incoming signal, first counter means producing a series of digital pulses, first means for comparing said digital pulses with said values relating to said desired function, said first comparing means producing an output signal when equality between the total of said digital pulses produced by said first counter means and said values relating to said desired function has been achieved, second means for comparing said output signal produced by said first comparing means with said incoming signal, said second comparing means producing an output signal proportional to the duty cycle of said incoming signal and the duty cycle of said output signal produced by said first comparing means causing said memory means to cycle about the value contained therein relating to said incoming signal wherein said second comparing means comprises second and third counter means each being selectively actuatable by said output signal produced by said first comparing means causing said second and third counter means to cycle in time proportional to the duty cycle of said incoming signal and the duty cycle of said output signal produced by said first comparing means.

4,503,550

DYNAMIC CCD INPUT SOURCE PULSE GENERATING CIRCUIT

Donald J. Sauer, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jul. 1, 1982, Ser. No. 394,313
Int. Cl.³ H03K 17/10, 17/693
U.S. Cl. 377—63 **9 Claims**



1. In an input structure for a charge coupled device (CCD) which includes a semiconductor substrate, a source electrode, a source region in said substrate connected to said electrode, a storage electrode insulated from said substrate, a potential well region in said substrate under said storage electrode, and a gate electrode insulated from said substrate and located between said storage electrode and said source electrode, means for coupling a first reference voltage to said gate electrode, means for coupling a second reference voltage to said storage electrode, a signal source coupled to one of said gate and storage electrodes, and a pulse source for supplying a pulse signal having a first voltage level during a first time period for causing a transfer of charge from said source region to fill said potential well region, and a second voltage level during a second time period for causing a transfer of charge from said potential well region to said source region to leave stored in said potential well region an amount of charge dependent upon the relative potential difference between said gate and storage electrodes, the improvement wherein said pulse source comprises:

a first capacitive element coupled to said source electrode;

first means coupled to said first capacitive element for maintaining said first voltage level across said first capacitive element during said first time period;

a second capacitive element coupled to said first capacitive element; and

second means including means for applying a voltage to said second capacitive element at the beginning of said second time period, which voltage is capacitively divided between said first and second capacitive elements and thereby changes the voltage level developed across said first capacitive element from said first voltage level to said second voltage level, and

means for applying a voltage to said second capacitive element at the end of said second time period, which voltage is capacitively divided between said first and second capacitive elements and thereby changes the voltage level developed across said first capacitive element from said second voltage level to said first voltage level.

4,503,551

SEMICONDUCTOR-GATED IONOGRAPHIC METHOD AND APPARATUS

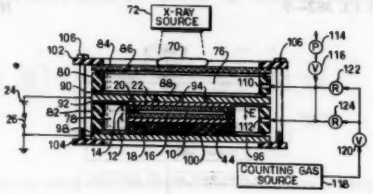
Ivor Brodie, Palo Alto, and Malcolm Thackray, Menlo Park, both of Calif., assignors to SRI International, Menlo Park, Calif.

Filed Apr. 30, 1982, Ser. No. 373,514
Int. Cl.³ B41M 5/00
U.S. Cl. 378—28 **4 Claims**

1. In a radiographic imaging method employing radiation such as x-rays, or the like, for producing an electrostatic charge image of radiation penetrating an object, the combination comprising,

establishing an electric field across a narrow gas gap formed between substantially plane surfaces of spaced photoconductor and flexible dielectric members,

holding said flexible dielectric member flat against one face of a platen formed within apertures which extend therethrough to the opposite face by supplying an ionizing gas to the gas gap at a subatmospheric pressure while maintaining gas pressure at the opposite face of the platen at a pressure less than the subatmospheric gas gap pressure to urge the flexible dielectric member into surface contact with the platen and,



gating localized gas ionization in the gas gap by absorption of penetrating radiation in the photoconductor member for the formation of electron-hole pairs and increased localized electric field strength across the gas gap to a level for localized gas ionization within the gas gap, charged particles of one polarity produced by said gated gas ionization being accelerated by said electric field onto said dielectric member for production of a latent electrostatic charge image thereon, the production of the latent electrostatic image on said dielectric member including gas ion amplification by Townsend dicharge in the gas gap.

4,503,552

SIMPLE MOUNTING STRUCTURE FOR DENTAL X-RAY APPARATUS

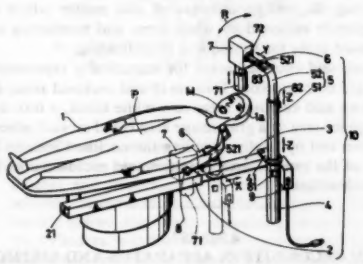
Masato Miyahara, Otsu; Michiaki Okano, Uji, and Daryl R. Beach, Atami, all of Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan

Filed Dec. 14, 1982, Ser. No. 449,740

Claims priority, application Japan, Dec. 15, 1981, 56-187254[U]; Dec. 17, 1981, 56-189244[U]

Int. Cl.³ A61B *6/14, 6/04*

U.S. Cl. 378—196 **10 Claims**



1. A simple mounting structure in a dental X-ray apparatus for use in combination with a substantially horizontal treatment bed to position an irradiation tube of an X-ray head in a specified and repeatable position with respect to the mouth region of a patient with his head placed on a headrest of the bed, said structure being characterized in that the structure comprises said treatment bed, an X-ray head support connected to one side of said bed and comprising an assembly of a plurality of hollow tubes adjustable in length in the three-dimensional directions of length, width and height of said head, and an X-ray head mounted at the end of said support and swingable in a back-and-forth direction with respect to an axis of said irradiation tube, said irradiation tube being mounted on said X-ray head and movable toward and away from said mouth region.

4,503,553

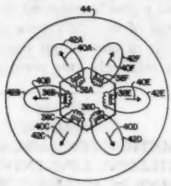
LOUDSPEAKER SYSTEM

Mark F. Davis, Medford, Mass., assignor to dbx, Inc., Newton, Mass.

Filed Jun. 3, 1983, Ser. No. 500,972

Int. Cl.³ H04R *5/02*

U.S. Cl. 381—24 **29 Claims**



1. A loudspeaker system comprising:

a plurality of loudspeaker drivers for producing sonic signals in response to electrical driving signals, at least two of said loudspeaker drivers each producing sonic signals substantially within the same frequency range;

means for mounting said loudspeaker drivers in a predetermined spatial array so that at least two of said drivers producing sonic signals substantially within the same frequency range are angularly spaced with respect to one another about a central axis; and

means for modifying the frequency and phase responses of at least two of said loudspeaker drivers producing sonic signals substantially within the same frequency range relative to one another so that said array of loudspeaker drivers produces a combined predetermined radiation dispersion pattern around said central axis in response to said electrical driving signals.

4,503,554

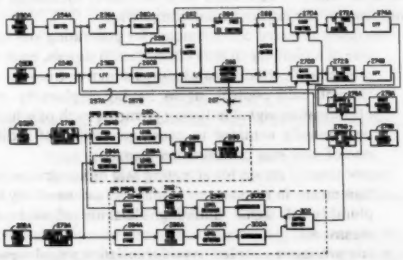
STEREOPHONIC BALANCE CONTROL SYSTEM

Mark F. Davis, Medford, Mass., assignor to dbx, Inc., Newton, Mass.

Division of Ser. No. 500,972, Jun. 3, 1983,. This application Jan. 9, 1984, Ser. No. 569,498

Int. Cl.³ H04R *5/00*

U.S. Cl. 381—28 **2 Claims**



1. In a signal processing system of the type for use with an audio reproduction system, said signal processing system comprising:

a pair of input terminals for respectively receiving a pair of stereophonic audio input signals;

a pair of output terminals for respectively providing a pair of stereophonic audio output signals;

a pair of signal paths for respectively transmitting said two input signals between said input and output terminals;

means coupled to each of said input terminals for detecting the signal energy levels of each of the corresponding input signals;

means for comparing the detected signal energy levels of said audio input signals and for generating a difference signal in response to and as a function of said comparison; and

means responsive to said difference signal and coupled between the system input and output terminals of at least one of said signal paths for varying the signal gain impressed on the input signal transmitted over said at least one path as a function of said difference signal so that said signal energy levels of said output signals are substantially balanced over relatively long periods of time.

4,503,555

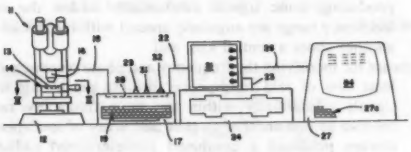
SEMI-AUTOMATIC OPTICAL SCANNING APPARATUS UTILIZING LINE INTEGRATION

George H. Brimhall, Jr., and Mark L. Rivers, both of Berkeley, Calif., assignors to University of California, Berkeley, Calif.

Filed Apr. 21, 1982, Ser. No. 370,490

Int. Cl.³ G06K *9/00, 9/20*

U.S. Cl. 382—6 **13 Claims**



1. In optical scanning apparatus for scanning specimens which exhibit areas of a plurality of visually distinguishable types, the apparatus having a visible indicia which is superimposed on the specimen as viewed by an operator, motor driven translation means for producing relative movement of said indicia and said specimen along a scan path therein, and translation signal generating means for producing translation signals each of which is indicative of a successive increment of said movement, the improvement comprising;

manually actuated control means for generating any selected one of a plurality of area classification signals, each of said area classification signals being distinctive from the others thereof, said control means having a plurality of area classification signal initiating elements each of which may be manually actuated to cause generation of a different one of said area classification signals,

motor control means for actuating said motor driven translation means in response to manual actuation of any of said plurality of signal initiating elements of said control means, and

a data processor coupled to said translation signal means and said manually actualted control means, said data processor including means for registering a value indicative of the number of said translation signals that are produced during each actuation of any of said area classification signal initiating elements.

4,503,556

METHOD FOR AUTOMATIC RECOGNITION OF WHITE BLOCKS AS WELL AS TEXT, GRAPHICS AND/OR GRAY IMAGE AREAS ON A PRINTED MASTER

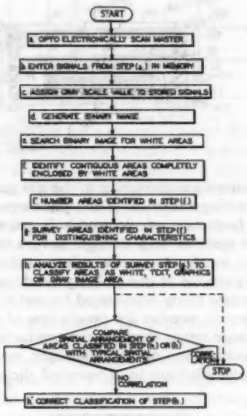
Wolfgang Scherl, Kafkastrasse 54, D-8000 Munich 83; Ludwig Abele, Lindenweg 3, D-8082 Grafrath, both of Fed. Rep. of Germany, and Friedrich Wahl, 5879 Herma St., San Jose, Calif. 95123

Filed Apr. 2, 1982, Ser. No. 364,930

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1981, 3113555

Int. Cl.³ G06K *9/34;* H04N *1/40*

U.S. Cl. 382—9 **10 Claims**


START
a. OPTO ELECTRONICALLY SCAN MASTER
b. ENTER SIGNALS FROM STEP(a.) IN MEMORY
c. ASSIGN GRAY SCALE VALUE TO STORED SIGNALS
d. GENERATE BINARY IMAGE
e. SEARCH BINARY IMAGE FOR WHITE AREAS
f. IDENTIFY CONTIGUOUS AREAS COMPLETELY ENCLOSED BY WHITE AREAS
f' NUMBER AREAS IDENTIFIED IN STEP(f.)
g. SURVEY AREAS IDENTIFIED IN STEP(f.) FOR DISTINGUISHING CHARACTERISTICS
h. ANALYZE RESULTS OF SURVEY STEP(g.) TO CLASSIFY AREAS AS WHITE, TEXT, GRAPHICS OR GRAY IMAGE AREA
COMPARE SPATIAL ARRANGEMENT OF AREAS CLASSIFIED IN STEP(h.) OR (b.) WITH TYPICAL SPATIAL ARRANGEMENTS
CORRELATION
STOP
NO CORRELATION
h' CORRECT CLASSIFICATION OF STEP(h.)

1. A method for automatic recognition of white blocks, text areas, graphics areas and/or gray image areas on a printed master comprising the steps of:

optoelectronically scanning said master for generating analog signals corresponding to the information carried on said master;

converting said analog signals into digital signals;

generating a binary image of the information carried on said master by a decision operation separating said digital signals into white level signals and black level signals;

searching said binary image for white areas;

identifying all contiguous areas of said master which are completely enclosed by white areas and numbering said enclosed areas for subsequent identification;

surveying said enclosed areas for numerically representing selected characterizing features of said enclosed areas; and

classifying said enclosed areas as a white block, a text area, a graphics area or a gray image area based on said selected features and optimally encoding the enclosed area on the basis of the type of area as which said enclosed area has been classified.

4,503,557

PATTERN RECOGNITION APPARATUS AND METHOD

Kenichi Maeda, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Apr. 8, 1982, Ser. No. 366,667

Claims priority, application Japan, Apr. 27, 1981, 56-63844

Int. Cl.³ G06K *9/64*

U.S. Cl. 382—34 **23 Claims**

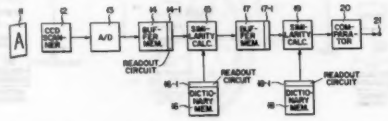
1. A pattern recognition apparatus for identifying an unknown input pattern as the one of a number of reference patterns to which the input pattern is most similar, the input pattern and reference patterns each being composed of a plurality of sub-area patterns, said apparatus comprising:

input means for converting the input pattern into digital electrical signals;

first dictionary memory means for storing a plurality of partial characteristic patterns;

first similarity calculating means connected to said input means and said first dictionary memory means for calculating an input pattern similarity matrix between the sub-area patterns of the input pattern and the partial characteristic patterns;

second dictionary memory means for storing a number of reference similarity matrices corresponding to the number of reference patterns, each of the reference similarity



matrices being calculated between the sub-area patterns of one of the reference patterns and the partial characteristic patterns;

second similarity calculating means connected to said first similarity calculating means and said second dictionary memory means for calculating similarities between the input pattern similarity matrix and each of the reference similarity matrices; and

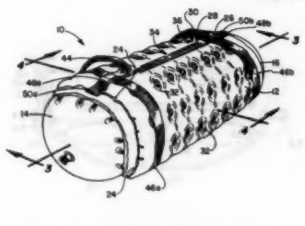
comparison means connected to said second similarity calculating means for identifying one reference pattern by comparing the similarities calculated by said second similarity calculating means.

4,503,558

INFLATABLE CONTAINER

Joseph R. Lief, Lewisville, and Michael D. McCully, Dallas, both of Tex., assignors to Polar Pouch, Inc., Carrollton, Tex.

Filed Feb. 15, 1984, Ser. No. 580,255
Int. Cl.³ B65D *30/24, 33/14*
U.S. Cl. 383;3 **4 Claims**



1. An inflatable container comprising:

(a) an inflatable, peripheral side wall formed of two sheets of flexible and impermeable material bonded together at selected locations thereof to define a single, inflatable cell having spaced side walls comprising essentially concentric cylinders, said side walls having a first pair of opposed edges, said first pair of opposed edges being convex when said peripheral side wall is in a deflated state prior to being formed into a cylindrical shape, and a second pair of opposed edges, said second pair of opposed edges being essentially parallel to each other and essentially parallel to a line bisecting said first pair of opposed edges;

(b) a pair of inflatable end portions, each of said end portions being bonded to respective ones of said first pair of opposed edges of said side wall to define a closed water tight cylindrical container, said inflatable end portions being essentially oval to effect a proper seal with respective ones of said first pair of opposed edges at each end of said container, said inflatable end portions being inflatable throughout essentially the entire respective surface areas thereof;

(c) closure means bonded to said peripheral side wall second pair of opposed edges in a manner to form said side wall into essentially a cylindrical container, said closure means defining an access opening in said container into the interior of said container, said closure means comprising a zipper mechanism;

and

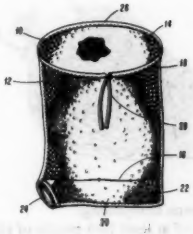
(d) carrying means comprising a pair of closed loop sections adapted to surround respective ends of said container adjacent respective ones of said first pair of opposed edges of said side wall to thereby support said container, an elongate strap section interconnecting said pair of closed loop sections adjacent respective ends of said zipper mechanism, and attachment means for removably attaching said carrying means to said container.

4,503,559

POPCORN BAG

Patsy L. Warnke, 700 W. Ridgeway, No. 420, Waterloo, Iowa 50701

Filed Sep. 20, 1982, Ser. No. 419,434
Int. Cl.³ B07B *13/04;* **B65D** *30/02*
U.S. Cl. 383—40 **3 Claims**



1. A flexible lightweight container for separating popped corn from unpopped kernels of corn, said container comprising an inner bag and an outer bag each open and joined at the top, the inner bag being formed of a mesh material in which the openings are large enough to allow unpopped kernels of corn to pass through them but small enough to prevent popped corn from passing through them, the outer bag being formed of a mesh material the openings of which are small enough to prevent both popped corn and unpopped kernels of corn from passing through them, and the inner bag being smaller than the outer bag to form a space between the bottom of the inner bag and the bottom of the outer bag, the space thereby receiving unpopped kernels that pass through the openings in the inner bag.

4,503,560

CHAMOIS HEAD COOLER

I. Stanley Bourne, 1900 Sam Bass, Apt. #B11, Denton, Tex. 76205

Filed Oct. 31, 1983, Ser. No. 547,257
Int. Cl.³ B65D *30/02, 30/10, 33/16*
U.S. Cl. 383—66 **3 Claims**

1. A cooling apparatus comprising:

a first sheet formed from chamois having a substantially circular shape and characterized by a relatively large diameter;

said first sheet being gathered to define a substantially flat bottom wall extending to a substantially circular rim and an annular partial top wall extending inwardly from the circular rim;

a second sheet formed from chamois having a substantially

circular shape and characterized by a relatively small diameter;

the periphery of the second sheet being sewn to the periphery of the first sheet along a circular line to complete the top wall of the apparatus;

said second sheet having an access port formed therein; and closure means for normally closing the access port of the second sheet.

4,503,561

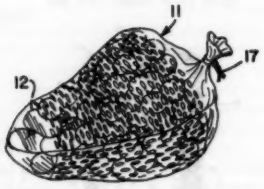
BAG FOR PACKAGED PRODUCE

Edward C. Bruno, 1880 S. Monaco Pkwy., Denver, Colo. 81016

Filed Aug. 12, 1983, Ser. No. 522,499

Int. Cl.³ B65D *33/04*

U.S. Cl. 383—102 **4 Claims**



1. Packaging means comprising:

a bag comprised of at least two panels of pliable film having side and bottom edges joined to form a bag with a normally openable upper end and a normally closed lower end; one of said panels having rows of spaced slits extending in a first direction, the slits in alternate rows being approximately aligned in a first transverse direction, and the slits in adjacent rows being offset lengthwise of the rows whereby said panel portion is adapted to stretch in said first transverse direction; and,

another of said panels having rows of spaced slits extending in a second direction transversely related to said first direction, the slits in alternate rows being approximately aligned transversely of said second direction and the slits in adjacent rows being offset lengthwise of the rows of said second direction, said other panel thereby being stretchable transversely to said second direction,

whereby said panels cooperate to provide a ventilated bag while limiting the stretching of the bag.

4,503,562

MAINTAINING FREQUENCY ACCURACY IN SINGLE SIDEBAND REPEATERS

W. Roy McClellan, III, Dallas; Richard J. Girvin, and William A. Conner, both of Plano, all of Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 29, 1983, Ser. No. 480,155

Int. Cl.³ H04B *7/14*

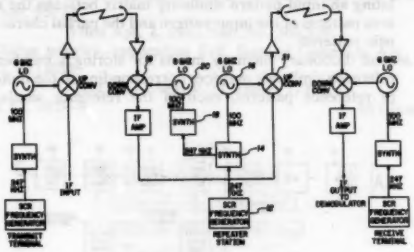
U.S. Cl. 455—22 **5 Claims**

1. A system for maintaining an accurate frequency source for controlling a plurality of converter stages in a single sideband repeater, comprising:

a station control reference (SCR) frequency generator;

a first local oscillator frequency synthesizer to provide a first output frequency for controlling one of said converter stages, including means for phase locking to the output of the SCR frequency generator in normal operation and free running upon failure of the SCR frequency generator;

a second local oscillator frequency synthesizer to provide a second output frequency for controlling a second one of



said converter stages, including means for phase locking to an output of said first synthesizer,

said output frequencies having a selected, fixed relationship between them and having sufficient accuracy to operate temporarily upon failure of said SCR frequency generator.

4,503,563

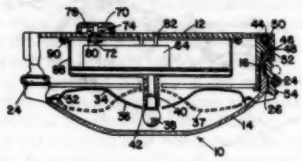
ELECTRICAL DEVICE IN A BUOYANT, WATERTIGHT HOUSING

Bruce R. Johnson, Petaluma, Calif., assignor to Jandy Industries, San Rafael, Calif.

Filed Jul. 14, 1983, Ser. No. 513,602

Int. Cl.³ H04B *1/08*; F21L *11/00*; F21V *31/00*; G01K *1/14*

U.S. Cl. 455—351 **7 Claims**



1. A buoyant, watertight, housed, electrical device comprising:

a housing shell;

electrically energized means in said housing shell;

at least one battery in said housing shell electrically connected to said electrically energized means;

a closure member;

interengagable, outer and inner nesting extensions on said shell and closure member, respectively;

a resilient seal ring interposed and sealing between said extensions;

interlocking means on said extensions engaged to prevent separation thereof;

the outer one of said nesting extensions being movable outward to enable said interlocking means to disengage; and

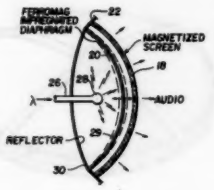
restraining means around said extensions operative in a first position to enable said outward movement and in a second position to prevent said outward movement.

4,503,564

OPTO-ACOUSTIC TRANSDUCER FOR A TELEPHONE RECEIVER

Seymour Edelman, 9115 Gleanridge Rd., Silver Spring, Md. 20910, and Aime S. DeReggi, 21000 Clarksburg Rd., Boyds, Md. 20720

Filed Sep. 24, 1982, Ser. No. 423,128
Int. Cl.³ H04B 9/00
U.S. Cl. 455—614 22 Claims



1. An opto-acoustical transducer for use in a telephone receiver or the like and including light transmission line means and a cavity, between the earpiece of the receiver and the ear of a user, covered by a diaphragm, comprising:

a directly illuminated, expansible, elastic audible sound-producing diaphragm secured to a fixed rim,

means for producing tension and curvature of the diaphragm for causing its shape to form a shallow segment of a sphere,

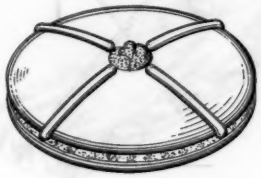
said diaphragm being further comprised of light-absorbing material and positioned so as to receive light from said light transmission line means,

said diaphragm being operable to directly absorb light from said light transmission line means to produce sound by being heated and cooled in response to the modulated light absorbed and accordingly expanding and contracting, the expansion and contraction acting with the tension in the diaphragm and the fixed rim to change the shape of the diaphragm which thereby imposes changes in the volume of the cavity covered by the diaphragm, with the consequent changes in pressure in the cavity being sensed as sound.

DESIGNS

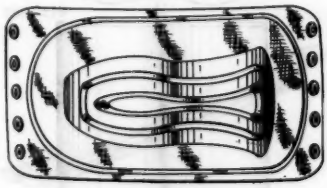
MARCH 5, 1985

277,804
DOME-SHAPED ICE CREAM SANDWICH
Lentheus A. Chisholm, 5011 NW. 177th St., Miami, Fla. 33055
Filed Nov. 12, 1982, Ser. No. 440,843
Term of patent 14 years
U.S. Cl. D1—101



277,805
LOWER BODY PROTECTOR
Eugene J. Vacanti, Edina, Minn., assignor to Sports Marketing, Inc., Minneapolis, Minn.
Filed Aug. 17, 1982, Ser. No. 408,853
Term of patent 14 years
U.S. Cl. D2—27

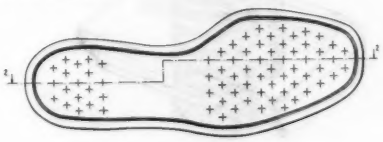
277,806
RIB PROTECTOR
Eugene J. Vacanti, Minneapolis, Minn., assignor to Sports Marketing, Inc., Minneapolis, Minn.
Filed Aug. 17, 1982, Ser. No. 408,857
Term of patent 14 years
U.S. Cl. D2—27



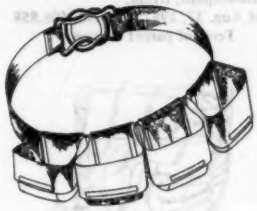
277,807
RIB CAGE PROTECTOR
Eugene J. Vacanti, Minneapolis, Minn., assignor to Sports Marketing, Inc., Minneapolis, Minn.
Filed Aug. 17, 1982, Ser. No. 408,858
Term of patent 14 years
U.S. Cl. D2—27

277,808
COMBINED FLUORESCENT AND REFLECTING SAFETY VEST FOR HUMANS
Kenneth A. Nichols, 40 Garfield St., Watertown, Mass. 02172
Filed Mar. 14, 1983, Ser. No. 475,300
Term of patent 14 years
U.S. Cl. D2—27

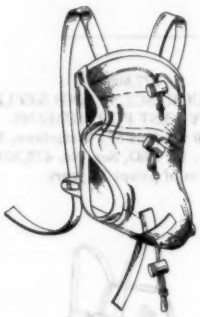
277,809
SHOE SOLE
William Hahn, Dreams Landing, Annapolis, Md. 21401
Filed Nov. 22, 1982, Ser. No. 443,836
Term of patent 14 years
U.S. Cl. D2—320



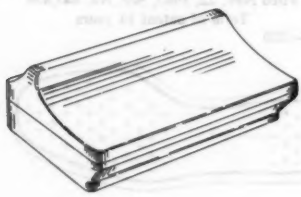
277,810
COMBINED BELT AND TENNIS BALL HOLDER
Bobby S. Pickens, 1403 Caldwell St., Greensboro, N.C. 27406
Filed Apr. 9, 1982, Ser. No. 366,925
Term of patent 14 years
U.S. Cl. D2—383



277,811
INFANT CARRIER
Ann A. Moore, Evergreen, Colo., assignor to Snugli, Inc., Evergreen, Colo.
Filed Mar. 15, 1982, Ser. No. 358,013
Term of patent 14 years
U.S. Cl. D3—31

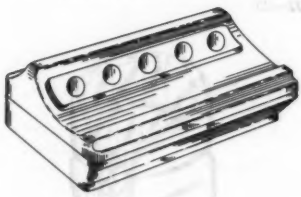


277,812
VANITY CASE
Bruce R. Thompson, 32 Shakespeare Ave., Tranmere, South Australia, Australia
Filed Nov. 1, 1982, Ser. No. 438,328
Claims priority, application Australia, May 5, 1982, 303/82
Term of patent 14 years
U.S. Cl. D3—39

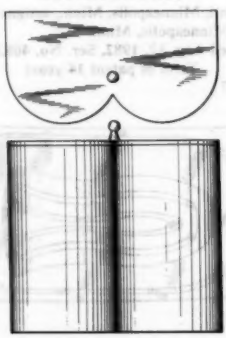


277,813
FOLDING CHAIR
Victor E. Grady, 15392 Cherbourg Ave., Irvine, Calif. 92714
Filed Sep. 24, 1982, Ser. No. 422,557
Term of patent 14 years
U.S. Cl. D6—349

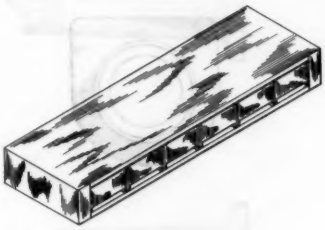
277,814
TOOTHBRUSH HOLDER
Bruce R. Thompson, 32 Shakespeare Ave., Tranmere, South Australia, Australia
Filed Nov. 1, 1982, Ser. No. 438,335
Claims priority, application Australia, May 5, 1982, 303/82
Term of patent 14 years
U.S. Cl. D6—534



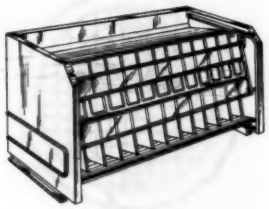
277,815
TOILET TISSUE STORAGE BOX
Patrice A. Veilleux, 367 Water St., Skowhegan, Me. 04976
Filed Feb. 14, 1983, Ser. No. 466,360
Term of patent 14 years
U.S. Cl. D6—520



277,816
DRAWER CASE
Karl W. Kleinert, 19601 Beach Cliff Blvd., Rocky River, Ohio 44116, and Kenneth B. Kleinert, 1285 E. Melrose Dr., Westlake, Ohio 44145
Filed Oct. 2, 1981, Ser. No. 307,779
Term of patent 14 years
U.S. Cl. D6—446

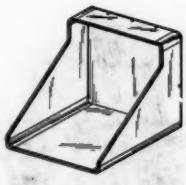


277,817
DISPLAY CABINET
Benjamin S. Weshler, 58-88 56th St., Maspeth, N.Y. 11378
Filed Jun. 24, 1982, Ser. No. 391,847
Term of patent 14 years
U.S. Cl. D6—471

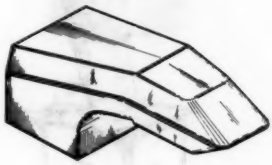


277,818
DRAWER-SUPPORTING RAIL FOR ATTACHMENT TO BED SIDE RAILS
Melvin P. Spitz, 619 N. Elm Dr., Beverly Hills, Calif. 90210
Filed Jan. 6, 1983, Ser. No. 456,069
Term of patent 14 years
U.S. Cl. D6—510

277,819
MERCHANDISE DISPLAY UNIT
Louis J. Crosslen, Grafton, Wis., assignor to Frank Mayer & Associates, Inc., Grafton, Wis.
Filed Sep. 13, 1982, Ser. No. 417,434
Term of patent 14 years
U.S. Cl. D6—449



277,820
MAGNETIC SOAP HOLDER
Elias S. Maayeh, Arlington, Tex., assignor to Uniplast, Inc., Grand Prairie, Tex.
Filed Dec. 5, 1983, Ser. No. 557,945
Term of patent 14 years
U.S. Cl. D6—538



277,821
VACUUM BOTTLE WITH CLOSURE CUP
Frederick L. Nestrock, Avon, Conn., assignor to Union Manufacturing Company, Meriden, Conn.
Filed Aug. 6, 1982, Ser. No. 406,062
Term of patent 14 years
U.S. Cl. D7—77

277,822

BAND SAW FOR MEAT

Lawrence A. Doggett, Dayton, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Apr. 22, 1982, Ser. No. 370,709
Term of patent 14 years
U.S. Cl. D7—385

277,823

COMBINED BOTTLE AND CAP

Ned Harris, New City, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Sep. 27, 1982, Ser. No. 423,885
Term of patent 14 years
U.S. Cl. D9—300

277,824

COMBINED BOTTLE NECK AND FINISH

Richard E. Hobbs, Huntington, Ind., assignor to Huntington Laboratories, Inc., Huntington, Ind.

Filed Apr. 28, 1982, Ser. No. 372,731
Term of patent 14 years
U.S. Cl. D9—367

277,825

COMBINED CONTAINER CAP AND SET OF LIGHTER REFILL ADAPTORS

David G. Whatley, Stoke on Trent, England, assignor to Permaflex, Ltd., England

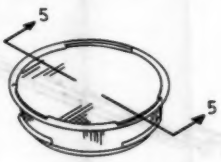
Filed Mar. 10, 1982, Ser. No. 356,623
Term of patent 14 years
U.S. Cl. D9—436

277,826

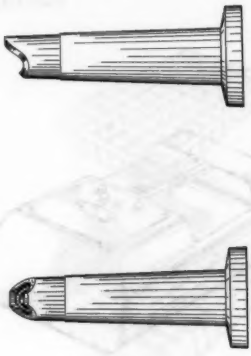
CONTAINER CAP

Marion F. Brown, Sr, Winston-Salem, N.C., assignor to Consolidated Foods Corporation, Winston-Salem, N.C.

Filed Jun. 25, 1982, Ser. No. 391,970
Term of patent 14 years
U.S. Cl. D9—439

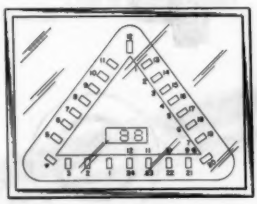


277,827
CAULKING SPOUT
Sven O. Olsson, 7019 Kerry Rd., Edina, Minn. 55435
Filed Sep. 29, 1982, Ser. No. 428,121
Term of patent 14 years
U.S. Cl. D9—447

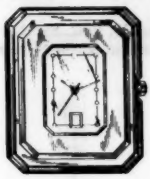


277,828
CONTAINER LID
James H. Schwartzburg, Lawrence, Kans., assignor to Packer Plastics, Inc., Lawrence, Kans.
Filed Jun. 28, 1982, Ser. No. 392,454
Term of patent 14 years
U.S. Cl. D9—454

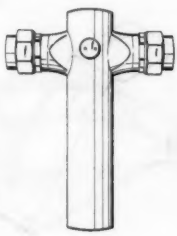
277,829
DIGITAL WATCH
Jean-Paul Legér, 445 Lakeview Park, Rochester, N.Y. 14613
Filed Mar. 16, 1983, Ser. No. 475,920
Term of patent 14 years
U.S. Cl. D10—38



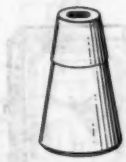
277,830
WATCH CASE
Marc Lederrey, Le Landeron, Switzerland, assignor to Rado Uhren AG, Lengnau, Switzerland
Filed May 17, 1982, Ser. No. 378,489
Term of patent 14 years
U.S. Cl. D10—39



277,831
TRANSMITTER FOR IN-LINE CONNECTION BY MEASURING OF FLUID CONSISTENCY
Pär H. S. Bergström, Vassvägen 5H, S-141 39 Huddinge, and Roland E. Jelvestam, Björnidegränd 29, S-163 64 Vällingby, both of Sweden
Filed May 14, 1982, Ser. No. 378,318
Claims priority, application Sweden, Nov. 25, 1981, 81-2760
Term of patent 14 years
U.S. Cl. D10—46

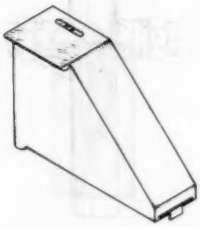


277,832
STORAGE WELL FOR CLINICAL TEMPERATURE PROBE AND ELECTRODE
Stephens N. Sato, Poway, Calif., assignor to Camino Laboratories, San Diego, Calif.
Filed Sep. 7, 1982, Ser. No. 415,240
Term of patent 14 years
U.S. Cl. D10—60

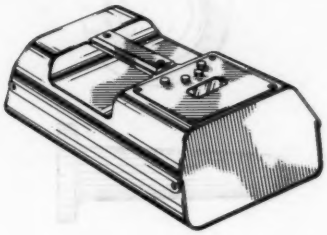


277,833
CHILD'S GROWTH MEASURING AND REGISTERING UNIT
Lowell C. Bergstedt, 47 Dartmouth St., San Francisco, Calif. 94134
Filed Aug. 25, 1982, Ser. No. 411,488
Term of patent 14 years
U.S. Cl. D10—71

277,834
RETRACTABLE TAPE MEASURE
Curtis Reeves, 4119 E. 72nd Pl., Tulsa, Okla. 74136
Filed Nov. 26, 1982, Ser. No. 444,683
Term of patent 14 years
U.S. Cl. D10—72

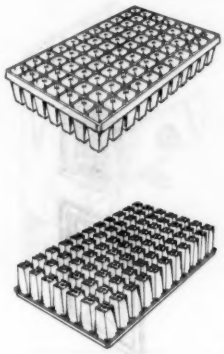


277,835
MERCURY VAPOR ANALYZER
Paul Nonnast, Jerome, Ariz., assignor to Jerome Instrument Corporation, Jerome, Ariz.
Filed Jul. 2, 1982, Ser. No. 394,875
Term of patent 14 years
U.S. Cl. D10—81

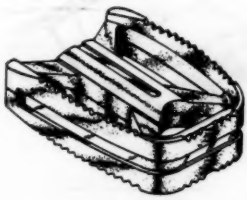


277,836
SMOKE ALARM
Kenneth M. Hattori, Bensenville, Ill., assignor to Emhart Industries, Inc., Indianapolis, Ind.
Filed Jan. 12, 1983, Ser. No. 457,451
Term of patent 14 years
U.S. Cl. D10—106

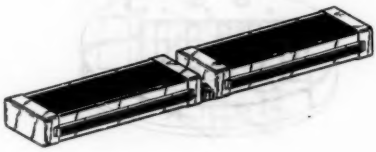
277,837
MULTIPLE PLANT CONTAINER
Tauno Turunen, Imatra, Finland, assignor to Enso-Gutzeit Oy, Imatra, Finland
Filed Dec. 15, 1982, Ser. No. 450,124
Claims priority, application Finland, Jun. 15, 1982, 531/82
Term of patent 14 years
U.S. Cl. D11—155



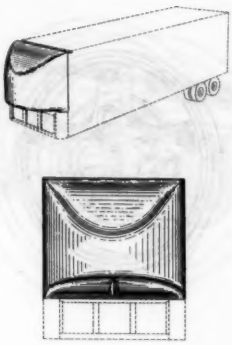
277,838
PEDAL
Jeffery G. Martin, Kettering, and Verlon D. Downing, Lima, both of Ohio, assignors to Huffy Corporation, Miamisburg, Ohio
Filed Jul. 28, 1982, Ser. No. 402,709
Term of patent 14 years
U.S. Cl. D12—125



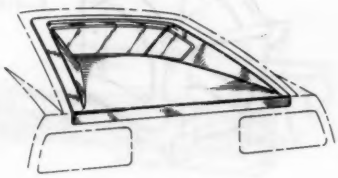
277,839
BUMPER
John L. Milton, Vancouver, Canada, assignor to Milton Manufacturing Inc., Richmond, Canada
Filed Jan. 4, 1983, Ser. No. 455,588
Term of patent 14 years
U.S. Cl. D12—169



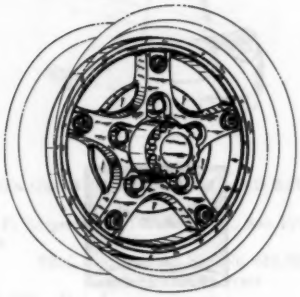
277,840
FAIRING FOR A TRUCK TRAILER
Charles-Henri Jacques, Beauceville est, Canada, assignor to Manac Inc., St-Georges-de-Beauce, Canada
Filed Dec. 9, 1982, Ser. No. 448,241
Claims priority, application Canada, Nov. 30, 1982, 30-11-82-7
Term of patent 14 years
U.S. Cl. D12—181



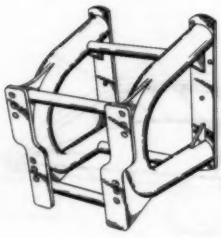
277,841
AUTOMOBILE HATCHBACK WINDOW MODIFICATION UNIT
Bennie E. Smith, 1211 W. Pottery, Lake Elsinore, Calif. 92330, and Bobbie R. Mandrell, 853 Reeves Pl., Pomona, Calif. 91767
Filed May 3, 1982, Ser. No. 374,175
The portion of the term of this patent subsequent to May 1, 1993, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—183



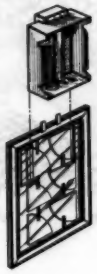
277,842
VEHICLE WHEEL CENTER
Raymond J. Hedlund, 1250 Pinecreek Way, Concord, Calif. 94520
Filed Dec. 9, 1982, Ser. No. 448,156
Term of patent 14 years
U.S. Cl. D12—211



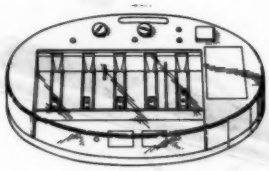
277,843
OUTBOARD MOTOR SUPPORT
James C. Gilbreath, 26225 Big Pines Hwy., P.O. Box 304, Wrightwood, Calif. 92397
Filed Sep. 13, 1982, Ser. No. 417,388
Term of patent 14 years
U.S. Cl. D12—317



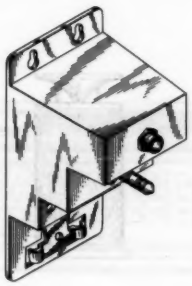
277,844
COMBINED SOLAR BATTERY AND CHARGER
Richard J. Toews, 31 W. Millport Rd., Lititz, Pa. 17543
Filed Jul. 15, 1982, Ser. No. 398,756
Term of patent 14 years
U.S. Cl. D13—8



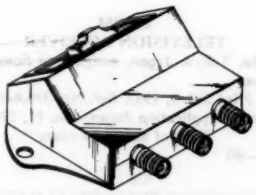
277,845
COMBINED BATTERY CHARGER, POWER SUPPLY AND BATTERY TESTER
Joseph W. K. Ip, Kowloon, Hong Kong, assignor to Vanson Electronics Limited, Kowloon, Hong Kong
Filed Aug. 31, 1982, Ser. No. 413,438
Claims priority, application United Kingdom, Jun. 3, 1982, 1007086
Term of patent 14 years
U.S. Cl. D13—5



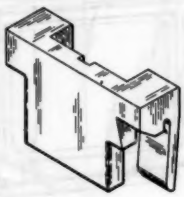
277,846
PORT BOX FOR CONNECTING WIRES OF COMPUTER INPUT AND OUTPUT CABLES
Thomas F. McLaughlin, Chappaqua, N.Y., assignor to Technical Support Services, Inc., Valhalla, N.Y.
Filed Aug. 16, 1982, Ser. No. 408,709
Term of patent 14 years
U.S. Cl. D13—24



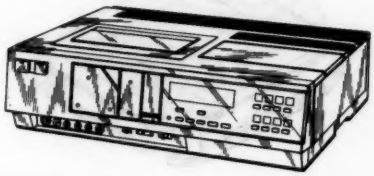
277,847
COAXIAL SWITCH
Chi-Hao Huang, No. 1, Chen Chung St., Chung Ho Li, Chang Hua City, Taiwan (500 R.O.C.)
Filed Aug. 13, 1982, Ser. No. 379,904
Term of patent 14 years
U.S. Cl. D13—32



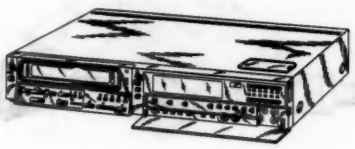
277,848
PROTECTIVE COVER FOR A HYBRID CIRCUIT SWITCHING DEVICE
James V. Koppensteiner, Chicago, and George Len, Arlington Heights, both of Ill., assignors to GTE Automatic Electric Incorporated, Northlake, Ill.
Filed Jun. 1, 1982, Ser. No. 383,364
Term of patent 14 years
U.S. Cl. D13—32



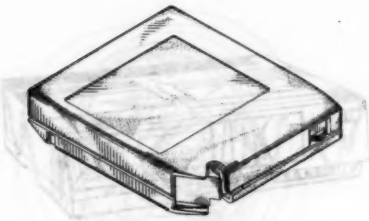
277,849
VIDEO TAPE RECORDER
Kazunori Hashimoto, Tokyo; Masakatu Iwasaki, Koganei, and Noboru Chiba, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 20, 1982, Ser. No. 409,894
Claims priority, application Japan, Mar. 19, 1982, 57-10967
Term of patent 14 years
U.S. Cl. D14—2

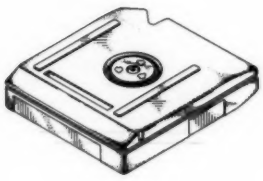


277,850
VIDEO TAPE RECORDER
Shin Miyashita, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Sep. 2, 1982, Ser. No. 414,563
Claims priority, application Japan, Mar. 8, 1982, 57-9349
Term of patent 14 years
U.S. Cl. D14—2



277,851
TAPE CARTRIDGE OR SIMILAR ARTICLE
David M. Gresham, Rome, Ga.; Paul Y. Hu, Tucson, Ariz.; Maurice E. Richard, Tucson, Ariz.; Philip C. Yenerich, Tucson, Ariz., and Roland Zapfe, Tucson, Ariz., assignors to International Business Machines Corp., Armonk, N.Y.
Filed Dec. 1, 1982, Ser. No. 445,786
Term of patent 14 years
U.S. Cl. D14—11

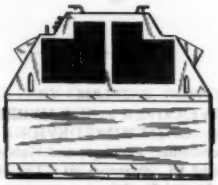




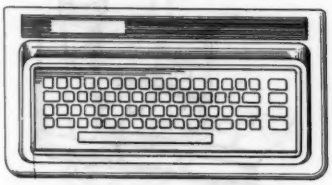
277,852
MICROPHONE
Alan R. Watson, Niles, Mich., assignor to Electro-Voice, Incorporated, Buchanan, Mich.
Filed Jul. 22, 1982, Ser. No. 400,946
Term of patent 14 years
U.S. Cl. D14—12

277,853
CONFERENCE WIRELESS MICROPHONE HOUSING OR THE LIKE
Elmer L. Thomas, Placentia, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Aug. 31, 1982, Ser. No. 413,329
Term of patent 14 years
U.S. Cl. D14—13

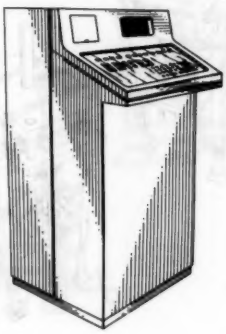
277,854
TELEVISION RECEIVER
Shunji Masuba, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Jul. 9, 1982, Ser. No. 396,640
Claims priority, application Japan, Jan. 11, 1982, 57-574
Term of patent 14 years
U.S. Cl. D14—80



277,855
COMPUTER
Ira Velinsky, Plainfield, N.J., assignor to Commodore Electronics Limited, Wayne, Pa.
Filed Aug. 27, 1982, Ser. No. 412,308
Term of patent 14 years
U.S. Cl. D14—100



277,856
COMPUTERIZED ELECTRONIC ROBOT CONTROLLER
Richard R. Lewellen, Wooster, Ohio, assignor to Nordson Corporation, Amherst, Ohio
Filed Jul. 26, 1982, Ser. No. 401,641
Term of patent 14 years
U.S. Cl. D14—103

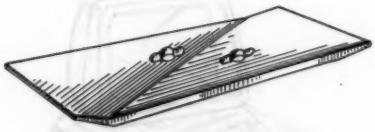


277,857
COMPUTER
Ira Velinsky, Plainfield, N.J., assignor to Commodore Electronics Limited, Wayne, Pa.
Filed Aug. 27, 1982, Ser. No. 412,310
Term of patent 14 years
U.S. Cl. D14—106

277,858
MAGNETIC DISC
Katsumasa Takahashi, and Katsutoshi Kikuchi, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Mar. 29, 1983, Ser. No. 480,147
Claims priority, application Japan, Sep. 30, 1982, 57-44589
Term of patent 14 years
U.S. Cl. D14—114

277,859
MAGNETIC DISC
Etsuro Saito, and Tohru Ichikawa, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Mar. 29, 1983, Ser. No. 480,148
Claims priority, application Japan, Sep. 30, 1982, 57-44590
Term of patent 14 years
U.S. Cl. D14—114

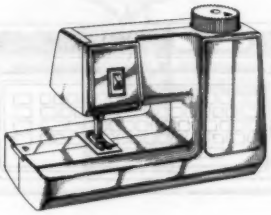
277,860
PLOUGH SHARE TIP
Arne H. Hellden, Linköping, Sweden, assignor to Aktiebolaget Overums Bruk, Overum, Sweden
Filed Mar. 29, 1982, Ser. No. 362,957
Claims priority, application Sweden, Oct. 20, 1981, 81-2370
Term of patent 14 years
U.S. Cl. D15—11



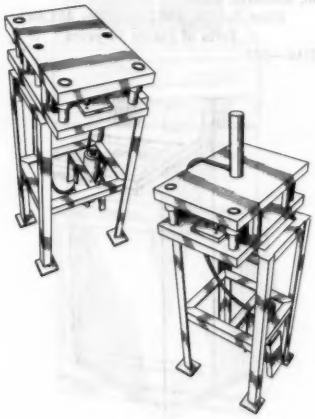
277,861
TRACTOR
Gerald E. Sieren, Greendale, Wis., assignor to Allis-Chalmers Corp., Milwaukee, Wis.
Filed Feb. 9, 1983, Ser. No. 465,158
Term of patent 14 years
U.S. Cl. D15—23

277,862
AGRICULTURAL SWEEP
William M. Johnson, Winchelsea, and Allan Lindsay, Hoppers Crossing, both of Australia, assignors to Ralph McKay Limited, Maidstone, Australia
Continuation-in-part of Ser. No. 31,490, Apr. 19, 1979, abandoned. This application Sep. 3, 1981, Ser. No. 299,218
Claims priority, application Australia, Oct. 19, 1978, 76254
Term of patent 14 years
U.S. Cl. D15—29

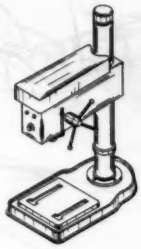
277,863
SEWING MACHINE
Michael E. Laude, Danbury; Thomas J. Pendelton, N. Wilton, both of Conn.; Douglas W. Smith, Belle Mead, N.J.; Robert E. Dawson, Ridgefield, Conn., and Andrew J. Blance, Rye, N.Y., assignors to The Singer Company, Stamford, Conn.
Filed Jan. 14, 1983, Ser. No. 457,840
Term of patent 14 years
U.S. Cl. D15—69



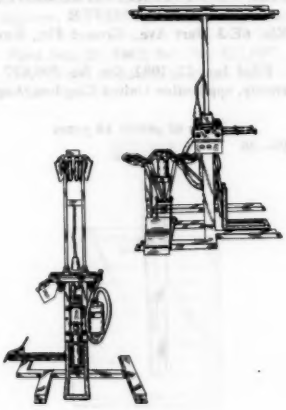
277,864
PUNCH PRESS APPARATUS
Glenn A. Hoffman, Jr., 8362 Seaport Dr., Huntington Beach, Calif. 92764, and Robert M. Avila, 249 Calle Esmarca, San Clemente, Calif. 92672
Filed Jun. 10, 1982, Ser. No. 386,961
Term of patent 14 years
U.S. Cl. D15—128



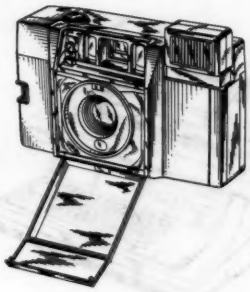
277,865
DRILLING MACHINE
Ruey Zon Chen, 18, Lane 144, Tucheng Rd., Tali Hsiang, Taichung Hsien, Taiwan
Filed Sep. 14, 1982, Ser. No. 417,891
Term of patent 14 years
U.S. Cl. D15—132



277,866
TIRE INSPECTION UNIT
Walter D. Hall, 13729 NE. Klickitat St., Portland, Oreg. 97230
Filed May 19, 1982, Ser. No. 379,864
Term of patent 14 years
U.S. Cl. D15—199



277,867
CAMERA
Fumitaka Io, and Yoshiro Takata, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Dec. 1, 1982, Ser. No. 445,829
Claims priority, application Japan, Jun. 1, 1982, 57-24386
Term of patent 14 years
U.S. Cl. D16—6

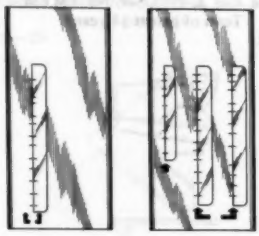


277,868
SUNGLASSES
Barbara J. Watson, Akron, Ohio, assignor to Onit Inc., Akron, Ohio
Filed Jan. 21, 1982, Ser. No. 341,528
Term of patent 14 years
U.S. Cl. D16—104

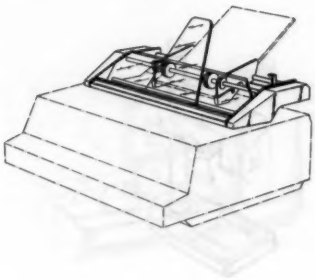
277,869
TAIL PIECE FOR A BANJO
Gary H. Price, 1117 Denmark, Grand Prairie, Tex. 75050
Filed Aug. 2, 1982, Ser. No. 404,634
Term of patent 14 years
U.S. Cl. D17—21

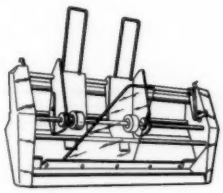
277,870
ELECTRONIC TYPEWRITER
Wayne C. Cathey, Bedford, Tex., assignor to Xerox Corporation, Stamford, Conn.
Filed Sep. 29, 1982, Ser. No. 427,205
Term of patent 14 years
U.S. Cl. D18—1

277,871
CONVERSION CALCULATOR
James E. Bubash, 252 Sunset Dr., St. Louis, Mo. 63011
Filed Sep. 30, 1982, Ser. No. 429,562
Term of patent 14 years
U.S. Cl. D18—9



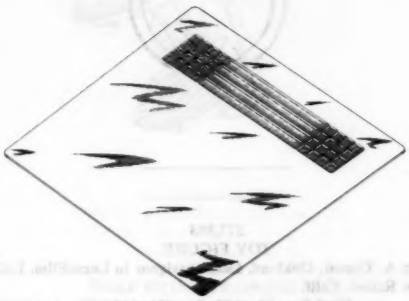
277,872
PAPER FEED MECHANISM FOR A PRINTER, TYPEWRITER, OR THE LIKE
Kurt Rünzi, Küsnachterstrasse 59, CH 8126 Zumikon, Switzerland
Filed Nov. 30, 1982, Ser. No. 445,425
Claims priority, application Switzerland, Oct. 14, 1982, 72688
Term of patent 14 years
U.S. Cl. D18—12



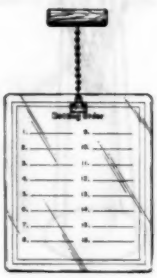


277,873
COMBINED WRITING INSTRUMENT AND CHRONOMETER
Wong W. Kin, 6E-3 Hart Ave., Ground Flr., Kowloon, Hong Kong
Filed Jun. 22, 1982, Ser. No. 390,827
Claims priority, application United Kingdom, Aug. 12, 1981, 1 001 964
Term of patent 14 years
U.S. Cl. D19—36

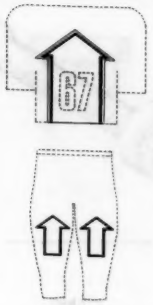
277,874
COMBINED WRITING BOARD AND PEN HOLDER
Walter Zeischegg, Turmstrasse 43, D-7910 Neu-Ulm, and Bernd Brüssing, Öschwende 38, D-7900 Ulm/Donau, both of Fed. Rep. of Germany
Filed Jan. 21, 1982, Ser. No. 341,584
Term of patent 14 years
U.S. Cl. D19—52



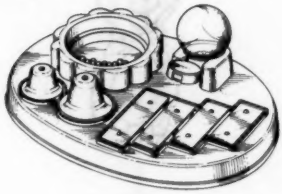
277,875
BATTING ORDER BOARD OR SIMILAR ARTICLE
Glenn C. Waggoner, Jr., 4226 St. George Pl., Riverside, Calif. 92504
Filed Sep. 29, 1982, Ser. No. 427,997
Term of patent 14 years
U.S. Cl. D19—88



277,876
POSITION IDENTIFICATION INSIGNIA FOR FOOTBALL PLAYER'S UNIFORM
Ramon Gordon, 3 E. 10th St., New York, N.Y. 10003
Filed Feb. 17, 1982, Ser. No. 349,640
Term of patent 14 years
U.S. Cl. D20—11



277,877
ACTIVITY TOY
Yasushi Chatani, Tokorozawa, Japan, assignor to Kawada Co., Ltd., Tokyo, Japan
Filed Jul. 27, 1982, Ser. No. 402,287
Claims priority, application Japan, Jun. 2, 1982, 57-24075
Term of patent 14 years
U.S. Cl. D21—59

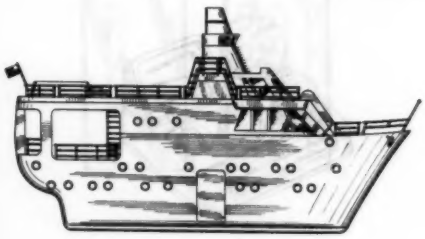


277,878
ACTIVITY TOY
Yasushi Chatani, Tokorozawa, Japan, assignor to Kawada Co., Ltd., Tokyo, Japan
Filed Jul. 27, 1982, Ser. No. 402,288
Claims priority, application Japan, Jun. 2, 1982, 57-24076
Term of patent 14 years
U.S. Cl. D21—59

277,879
BUBBLE PIPE
Harry Brown, Wilmette, Ill., assignor to Strombecker Corporation, Chicago, Ill.
Filed Sep. 30, 1982, Ser. No. 428,838
Term of patent 14 years
U.S. Cl. D21—61

277,880
TOY BEAR RATTLE
Terry Paczko, Cleveland, Ohio, assignor to Questor Corp., Tampa, Fla.
Filed Sep. 30, 1982, Ser. No. 431,675
Term of patent 14 years
U.S. Cl. D21—65

277,881
TOY CRUISE SHIP
Timothy A. Effler; Dale I. Goldberg, and Thomas P. Osborne, all of Cincinnati, Ohio, assignors to CPG Products Corp., Minneapolis, Minn.
Filed Jun. 30, 1982, Ser. No. 394,021
Term of patent 14 years
U.S. Cl. D21—130



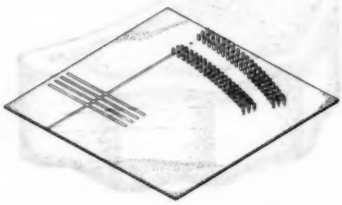
277,882
ELASTIC PROJECTILE FOR A HANDGUN PROJECTOR
Wayne G. Smith, 10129 Lowell Ave., Overland Park, Kans. 66212
Filed Jan. 18, 1982, Ser. No. 339,976
Term of patent 14 years
U.S. Cl. D21—145

277,883
TOY FIGURE
Philip A. Tippett, Oakland, Calif., assignor to LucasFilm, Ltd., San Rafael, Calif.
Filed Sep. 30, 1982, Ser. No. 432,160
Term of patent 14 years
U.S. Cl. D21—148

277,884
GAME BALL GOAL
James C. Offutt, Peoria, Ill., assignor to Rimball, Inc., Peoria, Ill.
Filed Jun. 3, 1982, Ser. No. 384,759
Term of patent 14 years
U.S. Cl. D21—201

277,885
TWO-WHEELED ROLLER SKATE
John L. Barrett, 427 S. Boone St., Boone, Iowa 50036
Filed Sep. 29, 1982, Ser. No. 426,773
Term of patent 14 years
U.S. Cl. D21—226

277,886
GOLF SWING TRAINING MAT
William A. Murphy, 13301 Ivie Rd., Galt, Calif. 95632
Filed Aug. 13, 1982, Ser. No. 419,859
Term of patent 14 years
U.S. Cl. D21—234

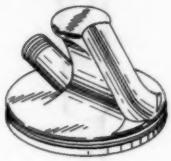


277,887
COMBINED VALVE HOUSING AND ESCUTCHEON
Edwin F. Bolgert, Kohler, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Nov. 29, 1982, Ser. No. 445,000
Term of patent 14 years
U.S. Cl. D23—31

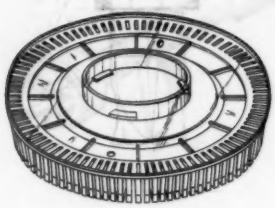
277,888
MATRIX BAND RETAINER
Dan W. Ericson, Ehrensvärdsgatan 6, S-212 13 Malmö, Sweden
Filed Mar. 19, 1982, Ser. No. 359,777
Claims priority, application Sweden, Sep. 21, 1981, 81-2039
Term of patent 14 years
U.S. Cl. D24—10

277,889
AIRWAY AIRFLOW INDICATOR FOR FACILITATING BLIND NASAL OR BLIND ORAL INTUBATION OF THE TRACHEA AND THE LIKE
George P. Beck, P.O. Box 16385, Lubbock, Tex. 79470
Filed Aug. 10, 1982, Ser. No. 406,924
Term of patent 14 years
U.S. Cl. D24—17

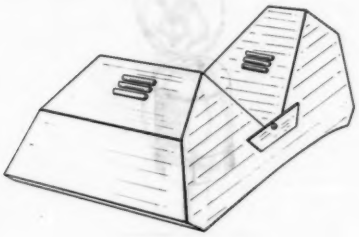
277,890
STETHOSCOPE HEAD
Jane W. Loughridge, Arden Hills, and Thomas J. Packard, Somerset, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed May 12, 1982, Ser. No. 377,376
Term of patent 14 years
U.S. Cl. D24—20



277,891
CUVETTE TRAY
Kenneth F. Uffenheimer, Mahopac, N.Y.; Dario Svenjak, Fairview, N.J.; Herman G. Diebler, Redding, Conn.; William J. C. McCandless, Ringwood, N.J.; Rand E. Herron, Wilton, Conn., and Stephen Saros, Wantagh, N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.
Filed Sep. 13, 1982, Ser. No. 416,804
Term of patent 14 years
U.S. Cl. D24—31

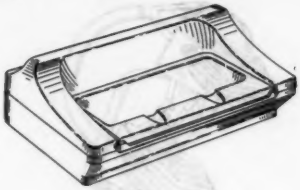


277,892
STROBE LIGHT BOX
Raymond E. Reding, 1182 S. La Brea, Los Angeles, Calif. 90019
Filed Sep. 7, 1982, Ser. No. 415,692
Term of patent 14 years
U.S. Cl. D26—24

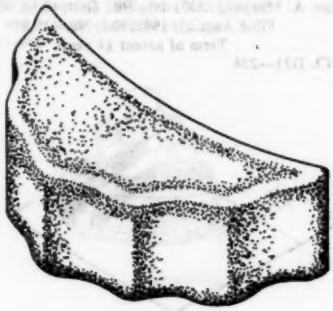


277,893
TANK MOUNTED UNDERWATER DIVING LIGHT
David L. Finnern, Costa Mesa, Calif., assignor to Joseph J. Ryan, Costa Mesa, Calif.
Filed May 10, 1982, Ser. No. 376,412
Term of patent 14 years
U.S. Cl. D26—37

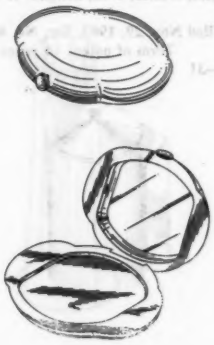
277,894
ASHTRAY
Bruce R. Thompson, 32 Shakespeare Ave., Tranmere, South Australia, Australia
Filed Nov. 1, 1982, Ser. No. 438,417
Claims priority, application Australia, May 5, 1982, 303/82
Term of patent 14 years
U.S. Cl. D27—8



277,895
SOAP CAKE
Claude T. Schlick, Box 478, Pentwater, Mich. 49449
Filed Sep. 29, 1982, Ser. No. 427,590
Term of patent 14 years
U.S. Cl. D28—8.1



277,896
COSMETIC BOX
Alain Chevassus, Sceaux, France, assignor to Lefebure Isolants Reunis, Rungis, France
Filed Jul. 26, 1982, Ser. No. 402,069
Claims priority, application France, Jan. 27, 1982, 820.254
Term of patent 14 years
U.S. Cl. D28—78

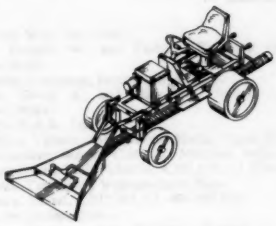


277,897

MOBILE MACHINE FOR CLEANING OUT THE HOLDS OF OIL TANKERS

Albert Lindqvist, St. Croix, V.I., assignor to Joseph K. Dikoff, St. Croix, V.I.

Filed Aug. 12, 1982, Ser. No. 407,631
Term of patent 14 years
U.S. Cl. D32—16

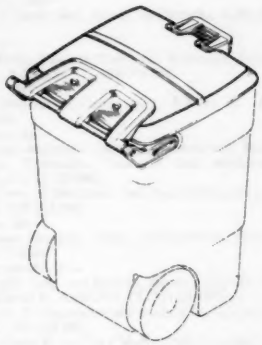


277,898

COMBINED HINGED LID AND HANDLE FOR A WHEELED REFUSE CART

Charles M. Paul, 8113 Golden Crest Way, Orangevale, Calif. 95662, and Samuel C. Crosby, 64 Willowick Dr., Decatur, Ga. 30038

Filed Sep. 15, 1982, Ser. No. 418,368
Term of patent 14 years
U.S. Cl. D34—11



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TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF MARCH, 1985

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Duda and Sons, Inc.: *See*—
King, Donald W.; and Placzek, Terrance M., 4,503,079, Cl. 426-54.000.

A. H. Robins Company, Incorporated: *See*—
Walsh, David A.; and Shamblee, Dwight A., 4,503,073, Cl. 514-539.000.

A. Menarini S.A.S.: *See*—
Pestellini, Vittorio; Ghelardoni, Mario; Giannotti, Danilo; Giolitti, Alessandro; Maggi, Carlo A.; Manzini, Stefano; Grimaldi, Guglielmo; and Meli, Alberto, 4,503,075, Cl. 514-622.000.

A/S Phonix, Tagpap og Vejmaterialer: *See*—
Hojberg, Svend, 4,502,813, Cl. 404-102.000.

Abbott Laboratories: *See*—
Haviv, Fortuna; and Walters, Roland L., 4,503,056, Cl. 514-252.000.

Abe, Koichi: *See*—
Fujii, Shuzo; Abe, Koichi; and Miwa, Hideo, 4,502,819, Cl. 406-14.000.

Abe, Masahiro: *See*—
Ohshima, Jiro; Abe, Masahiro; and Koshino, Yutaka, 4,502,207, Cl. 29-576.00B.

Abele, Ludwig: *See*—
Scherl, Wolfgang; Abele, Ludwig; and Wahl, Friedrich, 4,503,556, Cl. 382-9.000.

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Adam, Fritz G., to ITT Industries, Inc. Low power push-pull CMOS driver circuit. 4,503,342, Cl. 307-475.000.

Adams, Allan J., to ASC Incorporated. Control apparatus for pivotal-sliding roof panel assembly. 4,502,726, Cl. 296-221.000.

Adams, Derek W.: *See*—
Smith, Kenneth B.; and Adams, Derek W., 4,502,793, Cl. 374-124.000.

Adolph Coors Company: *See*—
Schultz, Robert H., 4,503,086, Cl. 427-54.100.

Adrian, David L. Card carrying microfilm and associated reading lens. 4,502,236, Cl. 40-365.000.

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Cullen, Steven R., 4,502,378, Cl. 100-65.000.

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Agency of Industrial Science & Technology: *See*—
Kobayashi, Toshiaki; and Tanaka, Masato, 4,503,232, Cl. 546-336.000.
Yumoto, Takaari; Hayakawa, Kiyoshi; Kawase, Kaoru; Yamakita, Hiromi; and Taoda, Hiroshi, 4,502,930, Cl. 204-160.100.

Aggarwal, Sundar L.: *See*—
Bingham, Robert E.; Durst, Richard R.; Fabris, Hubert J.; Hargis, Ivan G.; Livigni, Russell A.; and Aggarwal, Sundar L., 4,503,204, Cl. 526-187.000.

Agnew, Palmer W.; Erhard, John J.; and Kellerman, Anne S., to International Business Machines Corporation. Methodology for transforming a first editable document form prepared by an interactive text processing system to a second editable document form usable by an interactive or batch text processing system. 4,503,516, Cl. 364-900.000.

Ahmad, Syed I.: *See*—
Yun, Shyun-long; Leon, Luis P.; and Ahmad, Syed I., 4,503,146, Cl. 435-19.000.

Aida Engineering Ltd.: *See*—
Sato, Mitsuo, 4,502,379, Cl. 100-214.000.

Aiko, Yoriyuki: *See*—
Fujiya, Sigeru; Tsubaki, Tohru; Amano, Naoki; Yaginuma, Kyuzi; Kayaba, Hitoshi; Aiko, Yoriyuki; and Takahashi, Takeshi, 4,503,481, Cl. 361-341.000.

Air Products and Chemicals, Inc.: *See*—
Ford, Michael E.; and Johnson, Thomas A., 4,503,253, Cl. 564-479.000.
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Aisin Seiki Kabushiki Kaisha: *See*—
Arakawa, Susumu, 4,502,281, Cl. 60-585.000.
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Tadokoro, Tomoo; and Akagi, Toshimichi, 4,502,435, Cl. 123-198.00F.

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Aker, Johnny E.: *See*—
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Albright, John E.: *See*—
Wronski, Steve; Albright, John E.; and Carlson, Jeffrey J., 4,502,823, Cl. 409-134.000.

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Fastritsky, Viktor S.; Vingris, Laimonis T.; Ardentov, Vasily V.; Florinsky, Jury B.; Plotnikov, Viktor I.; Rodnevsky, Leonid A.; and Alexeev, Gennady N., 4,503,392, Cl. 324-232.000.

Alfille, Jules. Accessory holder module for optical equipment. 4,502,760, Cl. 350-318.000.

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Allan, David T. Scabbler bits. 4,502,734, Cl. 299-88.000.

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Hunt, Joseph M., 4,503,089, Cl. 427-86.000.

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Farrar, David; and Hawe, Malcolm, 4,503,172, Cl. 523-336.000.

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Brush, Robert W., Sr.; Luca, Vincent A., Jr.; and Shepler, Eric F., 4,502,748, Cl. 339-89.00M.
Degironimo, Bruno; Silverman, Neil D.; Oliver, William R.; and Rideout, Eugene C., 4,502,488, Cl. 128-692.000.
Delannoy, Philippe G.; Miller, Granville G.; Eckhardt, Helmut; and Baughman, Ray H., 4,502,981, Cl. 252-512.000.
Dickson, James; Nienart, Louis F.; and Roth, David W., 4,503,085, Cl. 427-34.000.
Frissora, Anthony P.; and Kojak, Alexander T., 4,502,528, Cl. 164-463.000.
Goebel, Gunther R.; and Hall, Richard G., 4,502,670, Cl. 266-220.000.
Kyriakos, Constantinos S.; Maurer, Dean S.; and Millio, Louis J., 4,503,401, Cl. 331-4.000.
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Bauer, Frederick C., 4,502,348, Cl. 74-482.000.
Lesiecki, Gerald; and Kraemer, Kenneth E., 4,502,693, Cl. 277-3.000.
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Kober, Kurt; Wohrle, Rudolf; and Kohler, Robert, 4,502,561, Cl. 280-446.00B.

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Kubo, Yoshizo; and Utagawa, Ikuo, 4,503,286, Cl. 178-18.000.

Tamukai, Tadao, 4,503,441, Cl. 346-139.00R.
Alsch, Gottfried, to Naimer, Hubert Laurenz. Star-delta-switch. 4,503,412, Cl. 335-170.000.
Alston, William W., Jr., to Audostart Corporation. Apparatus for measuring auditory reaction time. 4,502,489, Cl. 128-746.000.
Althoff, Heinz J., to Vereinigte Deutsche Metallwerke AG. Alloy and process for manufacturing rolled strip from an aluminum alloy especially for use in the manufacture of two-piece cans. 4,502,900, Cl. 148-440.000.
ALZA Corporation: *See*—
Edgren, David; Wong, Patrick S. L.; and Theeuwes, Felix, 4,503,030, Cl. 424-15.000.
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Tsutsumi, Akira, 4,503,313, Cl. 219-121.0LG.
Amano, Naoki: *See*—
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Amano, Yoshikazu: *See*—
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AMBAC Industries, Incorporated: *See*—
Voss, James R., 4,502,437, Cl. 123-357.000.
AMCA International Corporation: *See*—
Brewer, Bruce L., 4,502,527, Cl. 164-418.000.
Amdahl Corporation: *See*—
Doran, Robert W., 4,503,512, Cl. 364-761.000.
Amen, Jean: *See*—
Girardon, Philippe; and Amen, Jean, 4,503,036, Cl. 424-92.000.
Amstad, William E.: *See*—
Maddox, James P.; Jolley, Jack, Jr.; Drobnick, Louis W.; and Amend, William E., 4,502,839, Cl. 415-202.000.
American Can Company: *See*—
Phalin, Thomas L.; and Ulmes, James J., 4,502,313, Cl. 72-342.000.
American Cyanamid Company: *See*—
Lee, May D.; Borders, Donald B.; Labeda, David P.; Fantini, Amedeo A.; and Testa, Raymond T., 4,503,044, Cl. 514-2.000.
American Hoechst Corporation: *See*—
Walls, John E., 4,502,925, Cl. 204-33.000.
American Monitor Corporation: *See*—
Starr, Maurice, 4,503,012, Cl. 422-100.000.
American Multimedia, Inc.: *See*—
Clark, Richard L., 4,502,904, Cl. 156-157.000.
American Science and Engineering, Inc.: *See*—
Annis, Martin, 4,503,332, Cl. 250-366.000.
American Standard Inc.: *See*—
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American Sterilizer Company: *See*—
Fisher, Kenneth J., 4,502,506, Cl. 137-624.120.
AMP Incorporated: *See*—
Bright, Edward J.; Kandybowski, Steven J.; Sheesley, Wilmer L.; and Sinisi, David B., 4,502,747, Cl. 339-75.00M.
Forney, Edgar W., Jr.; and Hogendobler, Richard S., 4,502,749, Cl. 339-177.00R.
Ampex Corporation: *See*—
Fawkes, John S., 4,503,396, Cl. 328-127.000.
Ryan, John O., 4,503,466, Cl. 358-211.000.
Amtel Communications, Inc.: *See*—
Post, Kendall E.; and Henning, Paul N., 4,503,290, Cl. 179-18.0FC.
Analytics, Inc.: *See*—
Morris, C. Carson; Bielsker, Barry H.; and Cole, Donald A., 4,503,287, Cl. 178-22.080.
Anchor/Darling Valve Company: *See*—
Karpenko, Anatole N., 4,502,503, Cl. 137-527.800.
Andersen, Ingar F.; Lutts, Timothy W.; and Lam, Eddie W., to GCA Corporation. Apparatus and method for separating wax from an entrainer gas. 4,502,871, Cl. 55-82.000.
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Anderson, Keith D., to Northern Telecom Limited. Dual wavelength optical system. 4,502,762, Cl. 350-394.000.
Anderson, Paul A.: *See*—
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Anderson, Richard N., to Hunter Douglas Inc. Slatted blind assemblies having automatic opening and closing features. 4,502,523, Cl. 160-174.000.
Anderson, Rogers H. Speed control apparatus for powered trailer. 4,502,557, Cl. 180-14.200.
Ando, Kazuko: *See*—
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Angelov, Angel M.: *See*—
Antonov, Lyubomir Y.; Trenev, Alexander M.; Angelov, Angel M.; and Yanev, Kostadin D., 4,503,498, Cl. 364-200.000.
ANIC S.p.A.: *See*—
Francese, Renato; Fruttero, Roberta; Messori, Vittorio; and Peluffo, Anna, 4,502,881, Cl. 71-92.000.
Annis, Martin, to American Science and Engineering, Inc. Grazing angle detector array. 4,503,332, Cl. 250-366.000.
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Evans, John M.; and Wise, Colin C., 4,502,490, Cl. 128-780.000.
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Aoki, Masahiro: *See*—
Ida, Masatoshi; Oinoue, Kenichi; Aoki, Masahiro; and Hayashi, Asao, 4,503,467, Cl. 358-212.000.
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Aoki, Takaaki. Hand-held type opening and closing action tool. 4,502,220, Cl. 30-154.000.
Aono, Susumu: *See*—
Nakata, Shuji; Kawaguchi, Yoshio; and Aono, Susumu, 4,503,312, Cl. 219-117.100.
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Morita, Masahiko; Mano, Junichi; Nishida, Minoru; Tanaka, Tomoo; Aoyagi, Nobuo; and Takizawa, Syoichi, 4,502,897, Cl. 148-12.00F.
Applied Power Inc.: *See*—
Clark, Ray, 4,502,673, Cl. 267-64.240.
Arai, Yoshinao: *See*—
Takeda, Kenji; and Arai, Yoshinao, 4,503,507, Cl. 364-513.000.
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Suzuki, Akio; Akiyama, Mitsuo; Kashiwazaki, Susumu; Suzuki, Shigeyasu; Tominaga, Yasunori; and Arakawa, Michihisa, 4,502,290, Cl. 62-229.000.
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Araki, Kunihio, to Ricoh Company, Ltd. Apparatus for detecting vibration by comparing the phase relation of portions of a divided light image. 4,503,325, Cl. 250-204.000.
Araki, Toshiyuki: *See*—
Kyomasu, Mikio; Araki, Toshiyuki; Fukunaga, Shinobu; and Shindo, Masahiro, 4,503,520, Cl. 365-177.000.
Arcair Company: *See*—
Coughlin, William J.; Rieppel, Perry J.; and Hoffman, Stephen A., 4,502,179, Cl. 15-322.000.
Arce, Javier A.: *See*—
Fan, Lucy L.; and Arce, Javier A., 4,503,127, Cl. 426-438.000.
Archer, Michel, to Societe Anonyme S.T.A.S. Societe Technique d'Accessoires Specialises. Fatigue damage indicator. 4,502,337, Cl. 73-762.000.
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Fastritsky, Viktor S.; Vingris, Laimonis T.; Ardentov, Vasily V.; Florinsky, Jury B.; Plotnikov, Viktor I.; Rodnevsky, Leonid A.; and Alexeev, Gennady N., 4,503,392, Cl. 324-232.000.
Arena, Blaise J., to UOP Inc. Ruthenium hydrogenation catalyst with increased activity. 4,503,274, Cl. 568-863.000.
Arends, Albert W.: *See*—
Whiteside, Robert C.; Greynolds, Fred L.; and Arends, Albert W., 4,502,588, Cl. 198-409.000.
Arens, Hans, to 501 Grunbeck Wasseraufbereitung GmbH. Multi-tester for water treatment metering apparatus. 4,502,319, Cl. 73-3.000.
Ares, Roland A.; and Sylvester, Mark W., to Hussmann Corporation. Climatic control system. 4,502,292, Cl. 62-238.600.
Armco Inc.: *See*—
Cordea, James N.; Jasper, Joseph C.; and Sheth, Harshad V., 4,502,886, Cl. 75-125.000.
Arnold, Herbert: *See*—
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Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH: *See*—
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Dusel, Robert O.; and Blaha, Gerald E., 4,502,586, Cl. 198-345.000.
Arturo Salice S.p.A.: *See*—
Salice, Luciano, 4,502,807, Cl. 403-11.000.
Artz, Gerd; Figge, Dieter; Hoster, Thomas; and Philipp, Clemens, to FRIED. KRUPP Gesellschaft mit beschrankter Haftung. Seal for a continuous steel caster. 4,502,526, Cl. 164-415.000.
Artz, Klaus: *See*—
de Sousa, Bernardo; Schmid, Werner; and Artz, Klaus, 4,503,100, Cl. 427-428.000.
Arwidsson, Sven A.: *See*—
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Asahi Glass Company Ltd.: *See*—
Higaki, Hiromichi; and Miyazaki, Nobuyuki, 4,503,097, Cl. 427-386.000.
Asahi Kogaku Kabushiki Kaisha: *See*—
Kuroki, Yoshifumi, 4,502,775, Cl. 354-416.000.
Asai, Yoshimi; Takiguchi, Michitaka; and Horie, Fujio, to Brother Kogyo Kabushiki Kaisha. Electronic sewing machine. 4,502,401, Cl. 112-158.00B.
Asaka, Kazuo, to Hitachi Powdered Metals Co., Ltd. Process for making composite mechanical parts by sintering. 4,503,009, Cl. 419-6.000.

Asano, Hiroshi; Shimamune, Takayuki; and Hirao, Kazuhiro, to Permelec Electrode Ltd. Process for the production of ion exchange membranes with coating for electrolysis. 4,502,931, Cl. 204-192.00C.

Asbury, Charles E.: *See*—
Clausen, Victor H.; and Asbury, Charles E., 4,503,108, Cl. 428-108.000.

ASC Incorporated: *See*—
Adams, Allan J., 4,502,726, Cl. 296-221.000.

Ashitaka, Hidetomo: *See*—
Ueno, Haruo; Ashitaka, Hidetomo; and Nakajima, Koichi, 4,503,202, Cl. 526-140.000.

Associated Electrical Industries Limited: *See*—
Thanawala, Hemesh L., 4,503,380, Cl. 323-206.000.

AT&T Bell Laboratories: *See*—
Brown, John F.; and Stanton, Robert M., 4,503,090, Cl. 427-96.000.
Camlibel, Irfan; Guggenheim, Howard J.; Singh, Shobha; Van Uitert, LeGrand G.; and Zydzik, George J., 4,502,898, Cl. 148-188.000.
Dragone, Corrado, 4,503,435, Cl. 343-781.00P.
Eizenberg, Moshe; and Murarka, Shyam P., 4,502,209, Cl. 29-589.000.
Spires, Dewayne A., 4,503,289, Cl. 179-16.00F.
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AT&T Technologies, Inc.: *See*—
Chavers, Richard A.; and Duff, Oland J., 4,502,745, Cl. 339-17.00C.
Davis, Charles L.; Fegley, Charles R.; and Moll, Jack H., Jr., 4,502,215, Cl. 29-874.000.
Hancock, Harvey G.; and Szymanski, Michael E., 4,503,283, Cl. 174-22.00R.
Truax, Bruce E., 4,502,785, Cl. 356-376.000.
White, Frank T., 4,502,655, Cl. 248-228.000.

Atelier de Mecanique de Precision F.M.: *See*—
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Atlantic Richfield Company: *See*—
Anderson, Alfred J.; and Thomas, Robert J., 4,502,200, Cl. 29-526.00R.
Boitz, Gary L.; and Tulk, Thomas C., 4,502,233, Cl. 33-181.0AT.
Hansen, Gerald D., 4,502,959, Cl. 210-705.000.
Hearn, Daniel P., 4,503,330, Cl. 250-357.100.
Lowther, Frank E., 4,503,013, Cl. 422-127.000.
Mancinelli, Paul A., 4,503,188, Cl. 525-98.000.

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Atoji, Hitomi: *See*—
Ikuta, Kunio; and Atoji, Hitomi, 4,503,457, Cl. 358-75.000.

Aucoin, Thomas A.: *See*—
Iafrate, Gerald J.; Aucoin, Thomas A.; and Ferry, David K., 4,503,447, Cl. 357-16.000.

Audostart Corporation: *See*—
Alston, William W., Jr., 4,502,489, Cl. 128-746.000.

Ausonia Farmaceutic s.r.l.: *See*—
De Vincentiis, Leonardo, 4,503,076, Cl. 514-631.000.

Ausset, Alain: *See*—
Beauducel, Claude; Cretin, Jacques; Ausset, Alain; and Ringot, Gabriel, 4,503,526, Cl. 367-20.000.

Automated Optics, Inc.: *See*—
Tomesko, Charles L., 4,502,909, Cl. 156-356.000.

Automatic Liquid Packaging, Inc.: *See*—
Weiler, Gerhard H.; Anderson, Paul A.; and Pagels, Louis T., 4,502,614, Cl. 222-148.000.

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Avco Corporation: *See*—
Petro, David J., 4,502,275, Cl. 60-39.270.

Awerbuch, Leon; and Rogers, Alfred N., to Electric Power Research Institute, Inc. Silica stabilization and reinjection for geothermal method and apparatus. 4,502,285, Cl. 60-641.500.

Azizian, Hormoz: *See*—
Rempel, Garry L.; and Azizian, Hormoz, 4,503,196, Cl. 525-338.000.

Babcock & Wilcox Company, The: *See*—
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Slabinski, Chet J., 4,503,549, Cl. 377-49.000.

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Wedam, Werner F.; and Babcock, William E., 4,503,367, Cl. 315-371.000.

Back, Gerhard, to Ciba-Geigy Corporation. Bis-1:2-chromium complexes of disazo dyes, and their preparation and use. 4,502,860, Cl. 8-437.000.

Back, Gerhard; Beffa, Fabio; and Schutz, Hans-Ulrich, to Ciba-Geigy Corporation. Fibre-reactive chromium complex dyes, process for their manufacture and use thereof to dye cellulose or wool. 4,502,865, Cl. 8-543.000.

Bacon, Kenneth H., Sr. Combination counterflow heat exchanger and fractionating tower. 4,502,877, Cl. 62-42.000.

Bahar, Izak: *See*—
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.

Bailey, Theodore B., to United States of America, Navy. Absorption path controlled filter. 4,502,758, Cl. 350-267.000.

Bailey, Walter H., to United States of America, Army. Adaptive threshold detection utilizing a tapped charge transfer device delay line. 4,503,432, Cl. 343-7.00A.

Baileys, James P.; and Hedrick, Warren R., to Interpace Corporation. Insulated chimney assembly. 4,502,370, Cl. 98-60.000.

Bailin, Sidney C.: *See*—
Mason, Gary R.; Speaker, Kenneth W.; Macropol, James L.; McKie, Robert A.; and Bailin, Sidney C., 4,503,499, Cl. 364-200.000.

Baird, John K.; and Shim, Jaewon L., to Merck & Co., Inc. Non-heated gellan gum gels. 4,503,084, Cl. 426-573.000.

Bakker, John A., to Illinois Tool Works, Inc. Security device. 4,502,305, Cl. 70-49.000.

Baldwin Hardware Manufacturing Corporation: *See*—
Fayerman, Peter; and Shaffer, Elwood, 4,502,720, Cl. 292-348.000.

Ballard, John R., to Rolls-Royce Limited. Air intakes of aircraft mounted gas turbine engines. 4,502,875, Cl. 55-306.000.

Ballard, Philip D.; Goin, Cheryl A.; Josephson, Paul J.; Keller, Andrew D.; Lykins, Larry W.; and Miller, Jeffrey J., to International Business Machines Corporation. Toner cartridge and method of replenishing toner to a xerographic device. 4,502,514, Cl. 141-1.000.

Balli, Heinz; Gunzenhauser, Sigmund; Fletcher, Ian J.; and Bedekovic, Davor, to Ciba-Geigy Corporation. Chromogenic dihydroquinazolines. 4,503,227, Cl. 544-246.000.

Bals, Edward J. Rotary atomizing sprayer. 4,502,634, Cl. 239-223.000.

Balter, Floyd A.: *See*—
Moyer, Mark C.; Petersen, Clifford W.; Kusenberger, Felix N.; Perry, William D.; Balter, Floyd A.; and Teller, Cecil M., II, 4,503,393, Cl. 324-235.000.

Balzer and Droll KG: *See*—
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Bamberger, Carlos E.: *See*—
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Ban, Thomas E.: *See*—
Gardner, Samuel A.; and Ban, Thomas E., 4,503,018, Cl. 423-168.000.

Banda, Michael J.; Werb, Zena; Knighton, David R.; and Hunt, Thomas K., to University of California, The Regents of the. Extracellular nonmitogenic angiogenesis factor and method of isolation thereof from wound fluid. 4,503,038, Cl. 424-95.000.

Banfi, Andras; Leibinger, Janos; Molnar, Laszlo ; Nadori nee Kozel, Gizella; and Tar, Sandor, to Licencia Talalmanyokat Ertekesito Vallalat. Compositions for stimulating keratin formation in hair bulbs employing horseradish and mustard seed extracts. 4,503,047, Cl. 424-195.100.

Banford, Dennis W., to Peachtree Doors, Inc. Doorway structure. 4,502,249, Cl. 49-381.000.

Bantam Systems, Inc.: *See*—
Aldag, John, 4,502,369, Cl. 98-56.000.

Barancik, Martin B.: *See*—
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Barber, Loren L., Jr., to MacDermid, Incorporated. Method for electroplating metals using microemulsion additive compositions. 4,502,926, Cl. 204-45.100.

Barbero, Aquilino; and Realis Luc, Roberto, to Ing. C. Olivetti & C., S.p.A. Ink jet printing head and serial printer. 4,503,442, Cl. 346-140.00R.

Barclay, Donald J.; Morgan, William M.; and Vigar, James M., to International Business Machines Corporation. Electrodeposition of chromium and its alloys. 4,502,927, Cl. 204-51.000.

Barkley, Billy L., to Celanese Corporation. Process for producing self-texturing fabric with soft hand. 4,503,008, Cl. 264-342.00R.

Barlow, Peter L.; and Riches, Kenneth M., to Shell Oil Company. Process for the manufacture of a cutback of a mixture of bitumen and rubber. 4,503,176, Cl. 524-62.000.

Barnett, Stockton G., to Condar Co. Combustion gas mixing apparatus. 4,502,395, Cl. 110-214.000.

Barr, Kenneth J.: *See*—
McCullough, John G.; and Barr, Kenneth J., 4,502,979, Cl. 252-389.00R.

Bart, Hans-Jorg: *See*—
Marr, Rolf; Bart, Hans-Jorg; and Wachter, Reinhard, 4,503,015, Cl. 423-24.000.

Bartels-Keith, James R.; Boggs, Roger A.; Puttick, Anthony J.; and Sofen, Nancy M., to Polaroid Corporation. Photographic products and processes and novel compounds. 4,503,139, Cl. 430-219.000.

Barth, Wayne E., to Pfizer Inc. Process for 6-(aminomethyl)penicillanic acid 1,1-dioxide and derivatives thereof. 4,502,990, Cl. 260-245.20R.

Barth, Wayne E., to Pfizer Inc. 6-(Aminoacyloxymethyl)penicillanic acid 1,1-dioxides as beta-lactamase inhibitors. 4,503,040, Cl. 424-114.000.

Bartholet, Stephen J., to Odetics, Inc. Vertical actuator mechanism for the legs of a walking machine. 4,502,556, Cl. 180-8.600.

Basarte, Angel A. Inserting self-threaded rods into wooden bodies. 4,502,199, Cl. 29-433.000.

BASF Aktiengesellschaft: *See*—
Hoelderich, Wolfgang; Mross, Wolf D.; and Schwarzmann, Matthias, 4,503,281, Cl. 585-640.000.
Paust, Joachim; and Leininger, Hartmut, 4,503,238, Cl. 549-319.000.
Reffert, Rudi W.; Hambrecht, Juergen; Jung, Rudolf H.; and Echte, Adolf, 4,503,219, Cl. 528-481.000.
Sauer, Wolfgang; Halbritter, Klaus; and Engelbach, Heinz, 4,503,261, Cl. 568-471.000.

BASF Wyandotte Corporation: *See*—
Heyman, Duane A., 4,503,193, Cl. 525-205.000.
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Basile, Peter A.; and Blatherwick, William J., to Johnson & Johnson Dental Products Company. Amalgam dispensing device. 4,502,611, Cl. 221-93.000.

Basiulis, Algerd, to Hughes Aircraft Company. Heat pipe cooling module for high power circuit boards. 4,503,483, Cl. 361-385.000.

Bates, James F.: *See*—
Gates, Guy W.; Bates, James F.; Larsen, John F.; and Law, Benjamin F., 4,502,351, Cl. 74-753.000.

Baudrand, Donald W., to Richardson Chemical Company. Electrical contact materials. 4,503,131, Cl. 428-672.000.

Bauer, Adolf, to Krauss-Maffei AG. Mixing head. 4,503,014, Cl. 422-135.000.

Bauer, Frederick C., to Allis-Chalmers Corporation. Hand and foot throttle control linkage. 4,502,348, Cl. 74-482.000.

Bauer, Wilhelm: *See*—
Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.

Baughman, Ray H.: *See*—
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Bauld, Nathan L.; and Bellville, Dennis J., to Board of Regents, The University of Texas System. Di- and triphenylated cation radical polymers and their use as Diels-Alder catalysts. 4,503,195, Cl. 525-333.400.

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Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.

Baxter Travenol Laboratories: *See*—
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Bornatsch, Wolfgang; Kuth, Robert; and Perrey, Hermann, 4,502,863, Cl. 8-524.000.
Fauss, Rudolf; Linker, Karl-Heinz; and Findeisen, Kurt, 4,503,025, Cl. 423-384.000.
Harms, Wolfgang; Kuth, Robert; and Wunderlich, Klaus, 4,503,224, Cl. 544-187.000.
Kramer, Wolfgang; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,503,059, Cl. 514-326.00A.
Krishnan, Sivaram; Neuray, Dieter; Cohnen, Wolfgang; and Geisler, Klaus, 4,503,213, Cl. 528-199.000.
Maurer, Fritz; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,503,057, Cl. 514-269.000.
Rave, Roderich, 4,502,862, Cl. 8-437.000.

Baza Za Avtomatizacia Na Nauchniawxperiment: *See*—
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BBC Aktiengesellschaft Brown, Boveri & Cie: *See*—
Nicoll, Andrew R., 4,503,122, Cl. 428-678.000.

Beach, Daryl R.: *See*—
Miyahara, Masato; Okano, Michiaki; and Beach, Daryl R., 4,503,552, Cl. 378-196.000.

Beam, Harold D.: *See*—
McGhee, Edward C.; and Beam, Harold D., 4,502,629, Cl. 239-3.000.

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Marino, Joseph A.; Kling, Michael J.; and Roth, Sydney J., 4,502,324, Cl. 73-117.300.

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King, Hewson N. G.; and Beasley, James P., 4,503,334, Cl. 250-491.100.

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Beauducel, Claude; Cretin, Jacques; Ausset, Alain; and Ringot, Gabriel, to Institut Francais du Petrole; and Compagnie Generale de Geophysique. Device for water inflow detection inside a seismic streamer. 4,503,526, Cl. 367-20.000.

Becker, Carl; and Heizler, Fritz, to Ciba-Geigy Corporation. Storage stable mothproofing formulations. 4,502,861, Cl. 8-490.000.

Becker, Kenneth W.; Jackson, James R.; Lindblom, Gordon P.; and Walsh, Marjorie A., to Exxon Research & Engineering Co. Hydrocarbon solvent-based dispersant formulation and its use in the dispersion of viscous oil spills. 4,502,962, Cl. 210-749.000.

Becker, Martin: *See*—
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Becker, Theodore, Jr.; Congram, Sam R.; and McClung, Carl L., to Caterpillar Tractor Co. Valve construction for multi-fuel engine. 4,502,433, Cl. 123-188.00S.

Becker, Thomas P.; Stout, Christopher B.; and Hopp, Gene P., to Snap-on Tools Corporation. Calibrator for timing meter. 4,503,509, Cl. 364-571.000.

Becker, Willi, to Arthur Pfeiffer Vakuumtechnik Wetzlar GmbH. Turbo-molecular pump. 4,502,832, Cl. 415-10.000.

Becton, Dickinson and Company: *See*—
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Bedekovic, Davor: *See*—
Balli, Heinz; Gunzenhauser, Sigmund; Fletcher, Ian J.; and Bedekovic, Davor, 4,503,227, Cl. 544-246.000.

Bedel, Denis E., to North American Philips Lighting Corporation. Compact fluorescent lamp unit having segregated air-cooling means. 4,503,360, Cl. 315-112.000.

Beer, Arthur G.: *See*—
Stephenson, Ronald L.; and Beer, Arthur G., 4,502,659, Cl. 249-66.00R.

Beerman, Nancy E.: *See*—
Miller, James R.; Fayerman, Jeffrey T.; Kovacevic, Steven; and Beerman, Nancy E., 4,503,155, Cl. 435-172.300.

Beffa, Fabio: *See*—
Back, Gerhard; Beffa, Fabio; and Schutz, Hans-Ulrich, 4,502,865, Cl. 8-543.000.

Beggs, Russell J. Toothbrush. 4,502,177, Cl. 15-167.00R.

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Behme, Werner, to Parke, Davis & Company. Knife holder for sliding microtomes. 4,502,358, Cl. 83-700.000.

Behnke, Albert R., Jr.; Jones, John P., Jr.; Michielsen, Charles E., deceased; and by Michielsen, Sophie, legal representative. Cartridge for use in rebreathing apparatus. 4,502,876, Cl. 55-387.000.

Behr, Iley F. Message bank. 4,502,499, Cl. 133-6.000.

Belanger, Homer J.; and Patacca, Angelo M., to United Technologies Corporation. Containment structure. 4,503,104, Cl. 428-36.000.

Bell & Howell Company: *See*—
Stocker, Lester H., 4,502,676, Cl. 270-45.000.

Bell, John M.: *See*—
Hare, Harold L.; and Bell, John M., 4,502,287, Cl. 62-126.000.

Bell, Malcolm C. E.: *See*—
Dymock, Kenneth R.; and Bell, Malcolm C. E., 4,502,941, Cl. 208-10.000.

Bellville, Dennis J.: *See*—
Bauld, Nathan L.; and Bellville, Dennis J., 4,503,195, Cl. 525-333.400.

Belopolsky, Yakov, to Northern Telecom Limited. Thick film resistor. 4,503,418, Cl. 338-309.000.

Ben Clements & Sons, Inc.: *See*—
Kato, Masami, 4,503,006, Cl. 264-148.000.

Bend Research, Inc.: *See*—
Heller, Jorge, 4,502,976, Cl. 252-315.400.

Bender, Albert, to Maschinenfabrik Gehring Gesellschaft mit beschrankter Haftung & Co. Kommanditgesellschaft. Apparatus for holding workpieces. 4,502,255, Cl. 51-227.00R.

Bendickson, Roy B.; and Zuzinec, Raymond R., Sr., to Snap-on Tools Corporation. MacPherson spring compressor. 4,502,664, Cl. 254-10.500.

Bendix Corporation, The: *See*—
Spaargaren, Robert, 4,502,574, Cl. 188-79.50P.

Bennett, James G., Jr.; Tungate, Freddie L.; and Kokoszka, John J., to General Electric Company. Process for making ortho-alkylated phenols. 4,503,272, Cl. 568-804.000.

Bennett, John G., to United States of America, Army. Foldable, pop-open corner reflector decoy target articles. 4,503,101, Cl. 428-9.000.

Benton, Diana L. Chambered bracelet. 4,502,298, Cl. 63-1.00R.

Berg, Dieter: *See*—
Kramer, Wolfgang; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,503,059, Cl. 514-326.00A.

Bergman, Ernest R., to Copeland Corporation. Thermally protected dynamoelectric machine and method of assembly. 4,503,347, Cl. 310-68.00C.

Berkowitz, Phillip T.: *See*—
Tang, Kuo-Chang; and Berkowitz, Phillip T., 4,503,226, Cl. 544-193.000.

Berman, Michael L.; Silhavy, Thomas J.; and Weinstock, George M., to Litton Bionetics, Inc. Open reading frame vectors. 4,503,142, Cl. 435-6.000.

Berntsen, Inc.: *See*—
Rushing, William C., 4,502,258, Cl. 52-103.000.

Bert Moore Sales, Inc.: *See*—
Todd, Dale, 4,502,610, Cl. 220-346.000.

Bertin, Jean; and Frost, Jonathan R., to Synthelabo. Therapeutically useful 3,7a-diazacyclohepta[j,k]fluorene derivatives. 4,503,058, Cl. 514-214.000.

Bertram, Leo; and Schemmann, Hugo, to U.S. Philips Corporation. Electric motor having a stator iron of a bent shape. 4,503,346, Cl. 310-49.00R.

Bette, Willi: *See*—
Cirkel, Hans-Jurgen; Bette, Willi; and Muller, Reinhard, 4,503,542, Cl. 372-58.000.

Beyeler, Harry: *See*—
Darms, Roland; Haug, Theobald; and Beyeler, Harry, 4,503,285, Cl. 174-68.500.

Beyerlein, Robert A.; Poeppelmeier, Kenneth R.; and Jacobson, Allan J., to Exxon Research & Engineering Co. Cation-reordered, bismuth-containing perovskites. 4,503,166, Cl. 502-303.000.

Bianchi, Sergio: *See*—
Felder, Ernst; Bianchi, Sergio; and Bollinger, Heinrich, 4,503,252, Cl. 564-474.000.

Bielsker, Barry H.: *See*—
Morris, C. Carson; Bielsker, Barry H.; and Cole, Donald A., 4,503,287, Cl. 178-22.080.

Biere, Helmut; Rufer, Clemens; and Boettcher, Irmgard, to Schering Aktiengesellschaft. Diphosphonic acid derivatives and pharmaceutical preparations containing them. 4,503,049, Cl. 514-80.000.

Billet, Rene , to Societe Anonyme Francaise Du Ferodo. Method of reconditioning a diaphragm friction clutch and reconditionable clutch mechanism. 4,502,198, Cl. 29-402.080.

Binaghi, Marco: *See*—
Fiore, Leonardo; Binaghi, Marco; and Bonicelli, Ugo, 4,503,190, Cl. 525-108.000.
Bingham, Robert E.; Durst, Richard R.; Fabris, Hubert J.; Hargis, Ivan G.; Livigni, Russell A.; and Aggarwal, Sundar L., to General Tire & Rubber Company, The. Solution polymerization. 4,503,204, Cl. 526-187.000.
Biorganic Energy, Inc.: *See*—
Paton, Robert, 4,503,154, Cl. 435-167.000.
Biotest-Serum-Institut GmbH: *See*—
Kotitschke, Ronald; and Stephan, Wolfgang, 4,503,039, Cl. 424-101.000.
Biscuiterie Nantaise—BN: *See*—
Cosse , Lionel, 4,502,376, Cl. 99-450.400.
Bisson, Flavio, to Necchi Societa per Azioni. Upper thread cutting unit in buttonhole sewing machines. 4,502,404, Cl. 112-294.000.
Black & Decker Inc.: *See*—
Cuneo, Guiseppe, 4,503,370, Cl. 318-331.000.
Blaha, Gerald E.: *See*—
Dusel, Robert O.; and Blaha, Gerald E., 4,502,586, Cl. 198-345.000.
Blair, Lawrence W.; and Bryans, Alexander C., to General Electric Company. Multi stage centrifugal impeller. 4,502,837, Cl. 415-198.100.
Blankenship, Allen J.: *See*—
Pacifici, James G.; and Blankenship, Allen J., 4,503,268, Cl. 568-765.000.
Blankley, Clifton J., to Warner-Lambert Company. Substituted acyl derivatives of octahydro-1H-isoindole-1-carboxylic acids. 4,503,043, Cl. 514-10.000.
Blass, Harold, executor: *See*—
Breck, Donald W., deceased; Blass, Harold, executor; and Skeels, Gary W., 4,503,023, Cl. 423-328.000.
Blatherwick, William J.: *See*—
Basile, Peter A.; and Blatherwick, William J., 4,502,611, Cl. 221-93.000.
Bleeke, William F.; and Greve, James E., to CTS Corporation. Leak proof position sensor with permanent magnet shaft. 4,503,417, Cl. 338-176.000.
Blickenstaff, Ronald L.: *See*—
Coulson, Richard L.; Blickenstaff, Ronald L.; Dodd, P. David; Moreno, Robert J.; and Kinard, Dean P., 4,503,501, Cl. 364-300.000.
Block, Elliott: *See*—
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.
Blomquist, James E.: *See*—
Wilczewski, Robert H.; and Blomquist, James E., 4,502,796, Cl. 384-439.000.
Blomqvist, Olle. Apparatus for carrying out quadriceps training. 4,502,681, Cl. 272-142.000.
Blounthurst Limited: *See*—
Clarke, Herbert E.; and Lampkin, Peter R., 4,502,186, Cl. 24-16.0PB.
Blum, Alvin S.; and Dickey, James W., Jr. Foot exerciser. 4,502,680, Cl. 272-96.000.
Board of Regents, The University of Texas System: *See*—
Bauld, Nathan L.; and Bellville, Dennis J., 4,503,195, Cl. 525-333.400.
Bobst SA: *See*—
Habluetzel, Hans, 4,502,384, Cl. 101-153.000.
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., to International Flavors & Fragrances Inc. Methyl substituted-2-oxohexane derivatives and processes for preparing and using same. 4,503,259, Cl. 568-382.000.
Boehringer Ingelheim KG: *See*—
Walther, Gerhard; Schneider, Claus; Weber, Karl-Heinz; and Fugner, Armin, 4,503,060, Cl. 514-214.000.
Boehringer Mannheim GmbH: *See*—
Deeg, Rolf; Schlumberger, Helmut; and Ziegenhorn, Joachim, 4,503,144, Cl. 435-11.000.
Wiedemann, Fritz; Kampe, Wolfgang; Thiel, Max; Sponer, Gisbert; Roesch, Egon; and Dietmann, Karl, 4,503,067, Cl. 514-411.000.
Boeing Company, The: *See*—
Jung, Charles H.; and Jung, Charles G., 4,502,905, Cl. 156-184.000.
Boettcher, Irmgard: *See*—
Biere, Helmut; Rufer, Clemens; and Boettcher, Irmgard, 4,503,049, Cl. 514-80.000.
BOGE GmbH: *See*—
Meller, Theo; Knecht, Heinz; Kohberg, Ewald; and Lohr, Karl-Heinz, 4,502,672, Cl. 267-64.170.
Boggs, Roger A.: *See*—
Bartels-Keith, James R.; Boggs, Roger A.; Puttick, Anthony J.; and Sofen, Nancy M., 4,503,139, Cl. 430-219.000.
Bogue, Robert W.: *See*—
Sheridan, Richard B.; and Bogue, Robert W., 4,502,332, Cl. 73-661.000.
Boiocchi, Maurizio: *See*—
Tavazza, Giuseppe; and Boiocchi, Maurizio, 4,502,521, Cl. 152-381.400.
Boitz, Gary L.; and Tulk, Thomas C., to Atlantic Richfield Company. Shaft alignment apparatus and method. 4,502,233, Cl. 33-181.0AT.
Boler Investments, Inc.: *See*—
Jable, Roger D.; and Settle, Alva R., 4,502,707, Cl. 280-682.000.
Boliden Aktiebolag: *See*—
Gadd, Rolf K.; and Sund-Hagelberg, Anna C., 4,503,017, Cl. 423-87.000.
Bolingen, Johann: *See*—
Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, 4,502,642, Cl. 241-79.100.
Bollinger, Heinrich: *See*—
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Boltshauser, Werner: *See*—
Sonderegger, Conrad; Sonderegger, Hans C.; and Boltshauser, Werner, 4,503,351, Cl. 310-329.000.
Bonfiglioli, Silverio; and Gardellini, Giovanni, to Weber S.p.A. Carburetor for internal combustion engines with electromagnetic controlled devices for positioning the throttle in two positions with small openings. 4,502,436, Cl. 123-339.000.
Bonicelli, Ugo: *See*—
Fiore, Leonardo; Binaghi, Marco; and Bonicelli, Ugo, 4,503,190, Cl. 525-108.000.
Booker, David F.; Grove, David E.; Cotterill, Phillip J.; and Tyson, Robert G., to Johnson Matthey Public Limited Company. Process for recovering triarylphosphine from poisoned rhodium catalyst systems. 4,503,255, Cl. 568-17.000.
Bordato, James M.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Miller, Robert E.; Mudge, Ronald K.; Pace, Aldren M.; and Van Allen, Kent, 4,502,318, Cl. 73-3.000.
Borders, Donald B.: *See*—
Lee, May D.; Borders, Donald B.; Labeda, David P.; Fantini, Amedeo A.; and Testa, Raymond T., 4,503,044, Cl. 514-2.000.
Borg-Warner Corporation: *See*—
Butterfield, Roger P., 4,502,345, Cl. 74-336.00B.
Chang, Franklin S.; and Towers, James A., 4,503,099, Cl. 428-425.800.
Lech, Thaddeus, Jr.; and Popchock, Richard T., 4,502,582, Cl. 192-85.0AA.
Borgonovo, Flaminio: *See*—
Tobagi, Fouad A.; Fratta, Luigi; and Borgonovo, Flaminio, 4,503,533, Cl. 370-85.000.
Bornatsch, Wolfgang; Kuth, Robert; and Perrey, Hermann, to Bayer Aktiengesellschaft. Solid dyestuff formulations containing ethylenically unsaturated acid, ester and acrylonitrile copolymer. 4,502,863, Cl. 8-524.000.
Bornzin, Gene A., to Medtronic, Inc. Low-polarization low-threshold electrode. 4,502,492, Cl. 128-785.000.
Bosshart, George S.; and Matarese, Alfred P., to United Technologies Corporation. Prestressed ceramic coatings. 4,503,130, Cl. 428-632.000.
Bothe, Lothar: *See*—
Crass, Gunther; Janocha, Siegfried; Dietz, Wolfgang; and Bothe, Lothar, 4,502,263, Cl. 53-396.000.
Bott, Theodore R.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Miller, Robert E.; Mudge, Ronald K.; Pace, Aldren M.; and Van Allen, Kent, 4,502,318, Cl. 73-3.000.
Botwin, Leo; and Simpson, John A., to United Technologies Corporation. Gun-launched variable thrust ramjet projectile. 4,502,649, Cl. 244-3.100.
Boudreau, Daniel A., to Honeywell Information Systems Inc. Data processing system common bus utilization detection logic. 4,503,495, Cl. 364-200.000.
Bouillon, Claude; and Maignan, Jean, to Societe Anonyme dite: L'Oreal. Dithioether-based cosmetic composition for the treatment of the oily state of hair and skin. 4,503,033, Cl. 424-47.000.
Bourgogne, Michel; Guth, Jean-Louis; and Wey, Raymond, to Compagnie Francaise de Raffinage. Process for the preparation of synthetic zeolites, and zeolites obtained by said process. 4,503,024, Cl. 423-328.000.
Bourne, I. Stanley. Chamois head cooler. 4,503,560, Cl. 383-66.000.
Bowers, Derek F., to Precision Monolithics, Inc. Integrated circuit current mirror. 4,503,381, Cl. 323-315.000.
Bowling, Donald R.; and Smith, Charles F., to United States of America, Navy. Inside collet for coaxial placement of diode. 4,503,406, Cl. 333-245.000.
Boyd, Phil A., to Conoco Inc. Method of microbial assay. 4,503,149, Cl. 435-39.000.
Brabbs, William J.; and Hong, Charles A., to Procter & Gamble Company, The. Doughs and cookies providing storage-stable texture variability. 4,503,080, Cl. 426-94.000.
Bradley, William C.: *See*—
Hutchin, Richard A.; and Bradley, William C., 4,503,336, Cl. 250-578.000.
Brainard, Richard H.: *See*—
Sykes, Huey P.; and Brainard, Richard H., 4,503,414, Cl. 337-31.000.
Bramaud, Bernard: *See*—
Hennechart, Jean-Paul; Bramaud, Bernard; and Prat, Francois, 4,502,408, Cl. 118-61.000.
Brandes, Wilhelm: *See*—
Kramer, Wolfgang; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,503,059, Cl. 514-326.00A.
Brann, David E., to General Motors Corporation. High output oil cooled floating piston. 4,502,422, Cl. 123-41.350.
Braunsperger, Karl: *See*—
Von Au, Gunter; Wegehaupt, Karl-Heinrich; Schiller, August; and Braunsperger, Karl, 4,503,210, Cl. 528-33.000.

Breck, Donald W., deceased; by Blass, Harold, executor; and Skeels, Gary W., to Union Carbide Corporation. Silicon substituted zeolite compositions and process for preparing same. 4,503,023, Cl. 423-328.000.

Breitbach, Elmar, to Deutsche Forschungs- und Versuchsanstalt fur Luft-und Raumfahrt e.V. Process and apparatus for suppressing external load carrying wing flutter for aircraft. 4,502,652, Cl. 244-75.00A.

Bremer, Gordon; and Wachtel, Robert, to Paradyne Corporation. System for evaluating transmission line impairments. 4,503,545, Cl. 375-34.000.

Brenneisen, Kurt; and Koch, Werner, to Sandoz Ltd. Symmetrical unsubstituted and substituted 2-halo-4-(4'-(trisulfonaphthylazo)-phenylamino)-1,3,5-triazin-6-ylamino compounds. 4,502,866, Cl. 8-549.000.

Breston, Michael P.: *See*—
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Breuninger, Axel; Poilmann, Richard; and Scheyrer, Peter, to GFO Gesellschaft Fer Oberflachentechnik mbH. Process for producing scratch resistant antistatic sound and picture carrier. 4,503,094, Cl. 427-250.000.

Brewer, Bruce L., to AMCA International Corporation. Single shop continuous casting facility. 4,502,527, Cl. 164-418.000.

Brewer, Robert J., to U.S. Philips Corporation. Accumulation mode bulk channel charge-coupled devices. 4,503,450, Cl. 357-24.000.

Bright, David B.: *See*—
Wellington, Scott L.; Reisberg, Joseph; Lutz, Eugene F.; and Bright, David B., 4,502,538, Cl. 166-252.000.

Bright, Edward J.; Kandybowski, Steven J.; Sheesley, Wilmer L.; and Sinisi, David B., to AMP Incorporated. Pad array socket. 4,502,747, Cl. 339-75.00M.

Brille, Maurice, to Regie Nationale des Usines Renault; and Brille, Maurice. Rocker arm for axial engine. 4,502,427, Cl. 123-90.410.

Brillhart, Bruce A., to Honeywell Inc. Power up reset pulse generator. 4,503,344, Cl. 307-594.000.

Brimhall, George H., Jr.; and Rivers, Mark L., to University of California. Semi-automatic optical scanning apparatus utilizing line integration. 4,503,555, Cl. 382-6.000.

Bristol, James A.; and Sircar, Ila, to Warner-Lambert Company. Substituted phenyl-pyridinones as cardiotonic agents. 4,503,061, Cl. 514-338.000.

Bristol-Myers Company: *See*—
Algieri, Aldo A.; and Crenshaw, Ronnie R., 4,503,051, Cl. 514-183.000.
Savin-Czeizler, Andrei; and Lang, Kenneth, 4,502,721, Cl. 294-1.100.

Brittain, David R.; and Wood, Robin, to Imperial Chemical Industries PLC. Spiro-linked pyrrolidine-2,5-diones active as enzyme aldose reductase inhibitors. 4,503,066, Cl. 514-409.000.

Broadhurst, Thomas E., to Exxon Research & Engineering Co. Agitated heat exchanger to chill solvent-oil and wax slurry to wax filtration temperature. 4,502,787, Cl. 366-149.000.

Brock, Robert E.: *See*—
Luther, LeRoy D.; and Brock, Robert E., 4,502,660, Cl. 249-144.000.

Brocklehurst, Peter; and Ferguson, Angus S., to Sterling Drug Inc. Dry powder compositions for preparing point strippers. 4,502,891, Cl. 134-4.000.

Broders, Jack R. Carpet layer's wave-form template. 4,502,232, Cl. 33-174.00G.

Brodie, Ivor; and Thackray, Malcolm, to SRI International. Semiconductor-gated ionographic method and apparatus. 4,503,551, Cl. 378-28.000.

Bronstein-Bonte, Irena Y.; Lindholm, Edward P.; and Murphy, Richard J., to Polaroid Corporation. Image-receiving element with unitary image-receiving and decolorizing layer. 4,503,138, Cl. 430-213.000.

Brookfield, Peter A. M. Hand tool with toothed rotors for dislodging material from a surface. 4,502,223, Cl. 30-365.000.

Brooks, Edward J.; and Schauffele, Carl N., to Eastman Kodak Company. Exposure control apparatus. 4,503,508, Cl. 364-525.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Asai, Yoshimi; Takiguchi, Michitaka; and Horie, Fujio, 4,502,401, Cl. 112-158.00B.
Hattori, Shigenori, 4,502,803, Cl. 400-219.200.
Kuzuya, Susumu, 4,502,802, Cl. 400-212.000.

Brown, Boveri & Cie AG: *See*—
Neidig, Arno; Akyurek, Altan; and Hettmann, Hubert, 4,502,750, Cl. 339-275.00R.

Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., to Imperial Chemical Industries PLC. 6-Aryl-1,2,4-triazin-6-ones which possess cardiotonic properties. 4,503,054, Cl. 514-242.000.

Brown, John F.; and Stanton, Robert M., to AT&T Bell Laboratories. Thick film resistor circuits. 4,503,090, Cl. 427-96.000.

Brown, Peter E.: *See*—
Harrison, Stephen J.; and Brown, Peter E., 4,502,180, Cl. 16-52.000.

Brown, Richard A.; and Wilson, Richard K., to CVI Incorporated. Vacuum spool piece and joint. 4,502,714, Cl. 285-47.000.

Brown, Theodore C., Sr. Two piece closet ring. 4,502,166, Cl. 4-252.00R.

Brownawell, Darrell W.: *See*—
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Bruder, Alan H., to Polaroid Corporation. Method of making lithium batteries with laminar anodes. 4,502,903, Cl. 156-153.000.

Bruins, John: *See*—
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.

Brunke, Ernst-Joachim, to Dragoco Gerberüing & Co. GmbH. Use of 1,5-dimethyl-8-hydroximino-bicyclo[3.2.1]octane as perfuming ingredient. 4,502,985, Cl. 252-522.00R.

Brunner, Gerd; Hoffmann, Rainer; and Kunstle, Konrad, to Kraftwerk Union Aktiengesellschaft. Plant for extracting crude oil from oil shale. 4,502,919, Cl. 196-14.520.

Brunninger, Manfred: *See*—
Theurer, Josef; and Brunninger, Manfred, 4,502,389, Cl. 104-2.000.

Bruno, Edward C. Bag for packaged produce. 4,503,561, Cl. 383-102.000.

Brush, Robert W., Sr.; Luca, Vincent A., Jr.; and Shepler, Eric F., to Allied Corporation. Anti-decoupling device for an electrical connector. 4,502,748, Cl. 339-89.00M.

Bryans, Alexander C.: *See*—
Blair, Lawrence W.; and Bryans, Alexander C., 4,502,837, Cl. 415-198.100.

Brynestad, Jorulf; and Bamberger, Carlos E., to United States of America, Energy. Preparation of titanium diboride powder. 4,503,021, Cl. 423-297.000.

BTC Diagnostics Limited Partnership: *See*—
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.

Buat, Mario: *See*—
Dagna, Gian D.; and Buat, Mario, 4,503,443, Cl. 346-140.00R.

Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., to Intel Corporation. Apparatus for redundant operation of modules in a multiprocessing system. 4,503,534, Cl. 371-9.000.

Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., to Intel Corporation. Apparatus for recovery from failures in a multiprocessing system. 4,503,535, Cl. 371-11.000.

Burggrabe, A. Hilmar. Household grist mill. 4,502,643, Cl. 241-257.00R.

Burgin, Kermit H. Adjustable speculum with incorporated lighting system. 4,502,468, Cl. 128-18.000.

Burgin, Kermit H. Plastic forceps. 4,502,485, Cl. 128-321.000.

Buriks, Rudolf S.; and Dolan, James G., to Petrolite Corporation. Demulsifier composition and method of use thereof. 4,502,977, Cl. 252-340.000.

Burkard, Edward A., to National Gypsum Company. Manufacture of gypsum board from FGD gypsum. 4,502,901, Cl. 156-39.000.

Burkhardt, Horst; Huber, Josef; and Vollmayr, Norbert, to Dr. Johannes Heidenhain GmbH. NC Machine for producing tangential entry to and exit from a compensated contour. 4,503,493, Cl. 364-170.000.

Burns, Kenneth R.: *See*—
Rubbo, John T.; Burns, Kenneth R.; Heck, Ronald M.; and Early, John J., 4,502,444, Cl. 123-440.000.

Burrell, David E., to Owens-Illino., Inc. Octagonal container and blank therefor. 4,502,624, Cl. 229-41.00C.

Burroughs Corp.: *See*—
Lacher, William A., 4,503,472, Cl. 360-43.000.

Busch, Helmut: *See*—
Kupper, Heinz; and Busch, Helmut, 4,502,196, Cl. 29-157.00C.

Bushell, Hugh M. Closure device for containers of volatile liquids. 4,502,618, Cl. 222-396.000.

Butterfield, Roger P., to Borg-Warner Corporation. Accessory drive system. 4,502,345, Cl. 74-336.00B.

Buxton, Inc.: *See*—
Kohli, Jerry L., 4,502,188, Cl. 24-163.00K.

B.V. Neratoom: *See*—
Haesen, Wilhelmus M. J., 4,502,330, Cl. 73-623.000.

Byham, Don E., to Mobil Oil Corporation. Tertiary oil recovery. 4,502,540, Cl. 166-274.000.

C. L. Frost & Son, Inc.: *See*—
Nauta, Randal W., 4,502,738, Cl. 384-477.000.

C. R. Bard, Inc.: *See*—
Krug, John A., 4,502,502, Cl. 137-512.300.

Cabot Corporation: *See*—
Fife, James A., 4,502,884, Cl. 75-0.5AB.

Calder, Iain D.: *See*—
Serinken, Nur M.; Calder, Iain D.; Gale, James; and Fletcher, Norman C., 4,503,468, Cl. 358-256.000.

Calgon Carbon Corporation: *See*—
Urbanic, John E., 4,502,890, Cl. 127-46.200.

Calgon Corporation: *See*—
Sinha, Rabindra K., 4,503,019, Cl. 423-175.000.

Call, Daniel D.: *See*—
Carter, Larry D.; and Call, Daniel D., 4,502,218, Cl. 30-138.000.

Calvin, Vaughn; and Cox, Raymond J. Pivotal discharge apparatus. 4,502,851, Cl. 417-516.000.

Camirand, Wayne M., to United States of America, Agriculture. Method for reducing sodium content and simultaneously increasing potassium content of a food. 4,503,082, Cl. 426-271.000.

Camlibel, Irfan; Guggenheim, Howard J.; Singh, Shobha; Van Uitert, LeGrand G.; and Zydzik, George J., to AT&T Bell Laboratories. Diffusion procedure for semiconductor compound. 4,502,898, Cl. 148-188.000.

Campbell, Leo: *See*—
Sieberkrob, James; and Campbell, Leo, 4,502,189, Cl. 24-279.000.

Campbell, Nancy L.; Pinto, John G.; Drewe, John A.; Hayes, Patrick D.; and Nelson Robert A., to United States of America, Navy. Shielding apparatus for microwave thawing. 4,503,307, Cl. 219-10.55E.
Campbell, Neville D.: *See—*
Scrivener, Stephen P.; Smith, Wallace D.; Mansell, Mark L.; and Campbell, Neville D., 4,502,327, Cl. 73-146.000.
Canon Kabushiki Kaisha: *See—*
Ito, Yuji, 4,502,766, Cl. 351-206.000.
Katsuma, Makoto; Hiramatsu, Akira; and Murakami, Hiroyasu, 4,502,771, Cl. 354-289.100.
Suzuki, Ryoichi; and Tokuda, Ryuji, 4,502,774, Cl. 354-403.000.
Takahashi, Kazuo, 4,503,335, Cl. 250-548.000.
Cantarow, Walter D.: *See—*
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.
Cantey, Bryant W. Shipping pallet. 4,502,597, Cl. 206-392.000.
Cantrell, John L., to Ribi ImmunoChem Research, Inc. Pyridine soluble extract of a microorganism. 4,503,048, Cl. 424-195.000.
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Zuckerman, Matthew, 4,502,321, Cl. 73-23.000.
Cappel, Bert; Kerber, Helmut; Schuhmann, Siegfried; and Steiner, Gerd, to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft. Ink fountain having temperature responsive element. 4,502,386, Cl. 101-350.000.
Caprioli, Vincenzo; Longoni, Angelo; and Massardo, Pietro, to Montedison S.p.A. Acaricide compositions. 4,503,042, Cl. 514-499.000.
Caret, Jacky: *See—*
David, Gerard R.; Vallee, Jean-Claude; and Caret, Jacky, 4,503,449, Cl. 357-23.400.
Cargill, Inc.: *See—*
Evenwoll, David L., 4,503,424, Cl. 340-617.000.
Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co.: *See—*
Fischer, Heinrich, 4,502,822, Cl. 409-32.000.
Carlen, Bo R. J.; and Arwidsson, Sven A., to Solna Offset AB. Arrangement for stabilizing an eccentric bearing bush. 4,502,385, Cl. 101-218.000.
Carlson, Jeffrey J.: *See—*
Wronski, Steve; Albright, John E.; and Carlson, Jeffrey J., 4,502,823, Cl. 409-134.000.
Carnaby, Garth A., to Wool Research Organization of New Zealand (Inc.). Tufting machine needles. 4,502,403, Cl. 112-222.000.
Carr, Jay R., to Tidball, Keith A., a part interest. Electronic cattle guard. 4,503,399, Cl. 340-573.000.
Carre, Jean-Jacques, to Societe Anonyme D.B.A. Automatic-adjustment drum brake. 4,502,573, Cl. 188-79.50P.
Carrier Corporation: *See—*
Geary, Carl H., 4,502,809, Cl. 403-28.000.
Huenniger, Edward A., 4,502,530, Cl. 165-72.000.
Shelton, Edward B.; Hayes, Richmond S., Jr.; and Kozlowski, Robert M., 4,502,291, Cl. 62-285.000.
Carson, David G.: *See—*
Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., 4,503,534, Cl. 371-9.000.
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Carter, Duane E.; and Jucha, Rhett B., to Texas Instruments Incorporated. Two-step plasma process for selective anisotropic etching of polycrystalline silicon without leaving residue. 4,502,915, Cl. 156-643.000.
Carter, Ernest E., Jr., to Halliburton Services. Annular sample chamber, full bore, APR ® sampler. 4,502,537, Cl. 166-162.000.
Carter, Larry D.; and Call, Daniel D., to Oy Fiskars AB. Blade sharpener insert for knife scabbard. 4,502,218, Cl. 30-138.000.
Carter, Larry D., to Oy Fiskars AB. Knife sharpener and mounting bracket therefor. 4,502,254, Cl. 51-214.000.
Carter, Linda G., to Du Pont de Nemours, E. I., and Company. Substituted sulfonamides 1,3-benzodioxole. 4,502,882, Cl. 71-93.000.
Carter, Marshall C.: *See—*
Keel, Frederick; Townsend, Keith G.; and Carter, Marshall C., 4,502,299, Cl. 66-14.000.
Cartner, Jack O. Hydraulic mower head orienting apparatus for boom mowers. 4,502,269, Cl. 56-15.500.
Casio Computer Co., Ltd.: *See—*
Sano, Shigenori, 4,502,359, Cl. 84-1.190.
Caterpillar Tractor Co.: *See—*
Becker, Theodore, Jr.; Congram, Sam R.; and McClung, Carl L., 4,502,433, Cl. 123-188.00S.
Cavaliere, Joseph R.; and Liu, Peter T., to International Business Machines Corporation. Dynamic reference potential generating circuit arrangement. 4,503,523, Cl. 365-210.000.
Cavanna, Cesar E., to Richmond Lox Equipment Company. Apparatus for transferring fluid. 4,502,846, Cl. 417-362.000.
Celanese Corporation: *See—*
Barkley, Billy L., 4,503,008, Cl. 264-342.00R.
Celio, John A.: *See—*
Malik, Ashgar K.; and Celio, John A., 4,503,525, Cl. 365-222.000.
Centre de Recherche Industrielle du Quebec: *See—*
Fafard, Jean-Claude, 4,502,826, Cl. 411-340.000.
Centre Electronique Horloger S.A.: *See—*
Hermann, Jean, 4,503,353, Cl. 310-361.000.
Cervantes, Richard A.: *See—*
Singh, Gurvinder P.; and Cervantes, Richard A., 4,502,331, Cl. 73-627.000.
Cetus Corporation: *See—*
Geigert, John; and Neidleman, Saul L., 4,503,153, Cl. 435-147.000.
Chamberlin, Rhodes R., to Cherry Electrical Products Corporation. Process for forming patterned films. 4,502,917, Cl. 156-645.000.
Champion International Corporation: *See—*
Webinger, George P., 4,502,600, Cl. 206-626.000.
Chana, Howard E., to General Motors Corporation. Multistage gear pump and control valve arrangement. 4,502,845, Cl. 417-288.000.
Chandler, Michael J. Swimming pool cleaner. 4,502,172, Cl. 15-1.700.
Chang, Franklin S.; and Towers, James A., to Borg-Warner Corporation. Heat transfer surfaces having scale resistant polymer coatings thereon. 4,503,099, Cl. 428-425.800.
Chaparral Communications, Inc.: *See—*
Raiman, Clifford, 4,503,379, Cl. 333-21.00A.
Chapin, Roger A. Method and apparatus for automated chinese stir-fry cooking. 4,503,502, Cl. 364-400.000.
Charles Greiner And Company, Inc.: *See—*
Owens, Troy R., 4,502,471, Cl. 128-75.000.
Chartered Industries of Singapore Private Ltd.: *See—*
Sullivan, Leroy J., 4,502,367, Cl. 89-181.000.
Chauzu, Albert: *See—*
Mattelon, Jean-Claude; and Chauzu, Albert, 4,502,666, Cl. 254-134.3FT.
Chavers, Richard A.; and Duff, Oland J., to AT&T Technologies, Inc. Progressively-increasing clamping force lead and lead-substrate assembly. 4,502,745, Cl. 339-17.00C.
Chemie Linz Aktiengesellschaft: *See—*
Lunzer, Friedrich, 4,503,225, Cl. 544-190.000.
Chemische Werke Huls AG: *See—*
Hofmann, Peter; Regner, Hans; Koppner, Manfred; and Zolffel, Michael, 4,502,992, Cl. 260-410.90R.
Chen, Jackson C.: *See—*
Davis, Bryan T.; and Chen, Jackson C., 4,502,972, Cl. 252-47.000.
Chen, Nai Y.; and Koenig, Leonard R., to Mobil Oil Corporation. Process for converting carbohydrates to hydrocarbons. 4,503,278, Cl. 585-469.000.
Cheney, Richard F., to GTE Products Corporation. Method for making metal powder. 4,502,885, Cl. 75-0.50B.
Cheng, Paul J., to Phillips Petroleum Company. Method of producing carbon black. 4,503,027, Cl. 423-450.000.
Cherry Electrical Products Corporation: *See—*
Chamberlin, Rhodes R., 4,502,917, Cl. 156-645.000.
Chevron Research Company: *See—*
Denisevich, Peter, Jr.; Suzuki, Shigeto; Kurkov, Victor P.; and Schroeder, Albert H., 4,502,980, Cl. 252-500.000.
Olbrich, Hazel C.; and O'Rear, Dennis J., 4,502,945, Cl. 208-120.000.
Ching, Ta-Yen, to General Electric Company. UV-Stabilized resins. 4,503,180, Cl. 524-293.000.
Chisso Corporation: *See—*
Sugimori, Shigeru; and Kojima, Tetsuhiko, 4,502,974, Cl. 252-299.630.
Chloride Group Public Limited Company: *See—*
Hayes, Michael H.; and Pearson, Ernest J., 4,502,211, Cl. 29-623.100.
Choi, Kyu-Hwan. Mechanical seal with fluid flow-reversing means. 4,502,695, Cl. 277-12.000.
Chou, Yueting: *See—*
Dyroff, David R.; Chou, Yueting; and Cova, Dario R., 4,502,923, Cl. 203-71.000.
Chrisoghilos, Andrei V., to Institutul Natzional de Motoare Termice. Method and engine for the obtainment of quasi-isothermal transformation in gas compression and expansion. 4,502,284, Cl. 60-682.000.
Chrisp, George F., to Northern Engineering Industries PLC. Arc interrupter. 4,503,302, Cl. 200-147.00R.
Christatos, Jerry P. Sliding and pivoted closure for a lock box. 4,502,609, Cl. 220-329.000.
Christen, Hans D., to Rain Bird Sprinkler Mfg. Corp. Trickle irrigation unit. 4,502,631, Cl. 239-106.000.
Christian, Pamela H. Device for manually ventilating a patient. 4,502,481, Cl. 128-205.240.
Chu, Chin-Chiun, to Mobil Oil Corporation. Catalysts for para-ethyltoluene dehydrogenation. 4,503,163, Cl. 502-183.000.
Chursin, Stepan T.: *See—*
Trubitsyn, Alexandr V.; Fomin, Georgy M.; Nedovizy, Ivan N.; Petrov, Pavel E.; Denisov, Petr I.; Tulupov, Sergei A.; Chursin, Stepan T.; Kuptsynov, Vladimir N.; Merkulov, Adolf K.; and Stobbe, Lev G., 4,502,895, Cl. 148-11.50Q.
Ciba-Geigy Corporation: *See—*
Back, Gerhard, 4,502,860, Cl. 8-437.000.
Back, Gerhard; Beffa, Fabio; and Schutz, Hans-Ulrich, 4,502,865, Cl. 8-543.000.
Balli, Heinz; Gunzenhauser, Sigmund; Fletcher, Ian J.; and Bedekovic, Davor, 4,503,227, Cl. 544-246.000.
Becker, Carl; and Heizler, Fritz, 4,502,861, Cl. 8-490.000.
Cleverdon, Jo Ann, 4,502,864, Cl. 8-527.000.
Darms, Roland; Haug, Theobald; and Beyeler, Harry, 4,503,285, Cl. 174-68.500.
de Sousa, Bernardo; Schmid, Werner; and Artz, Klaus, 4,503,100, Cl. 427-428.000.
Drabek, Jozef, 4,503,069, Cl. 514-469.000.
Jehle, Nikolaus; Thuer, Markus; and Losert, Ewald, 4,502,957, Cl. 210-690.000.
Ciccia, Lawrence P.: *See—*
Elliott, Richard M.; Holland, Larry L.; Gilbride, Andrew J.; Gilligan, Thomas J., III; Ciccia, Lawrence P.; and Martin, John F., 4,503,091, Cl. 427-180.000.

Cirkel, Hans-Jurgen; Bette, Willi; and Muller, Reinhard, to Kraftwerk Union Aktiengesellschaft. High-energy laser of the TE-type. 4,503,542, Cl. 372-58.000.

Citizen Watch Company Limited: *See*—
Kunita, Masao; and Kurihara, Toshio, 4,502,382, Cl. 101-93.040.
Togashi, Seigo; and Sekiguchi, Kanetaka, 4,502,204, Cl. 29-571.000.

Clancey, Stephen M., to Eaton Corporation. Fluid coupling with hysteresis reducing valve. 4,502,580, Cl. 192-58.00B.

Clancy, Frank M., Jr., to Sanymetal Products Co., Inc., The. Cam operated door hinge. 4,502,183, Cl. 16-318.000.

Clark, Douglas C., to R. J. Reynolds Tobacco Company. Automatic accumulator for rectangular articles. 4,502,587, Cl. 198-347.000.

Clark, Gerald L.; and Ford, Terry P., to Kimberly-Clark Corporation. Longitudinal folding of webs, folding board system therefor. 4,502,675, Cl. 270-40.000.

Clark, Ray, to Applied Power Inc. Integral shock absorber and spring assembly. 4,502,673, Cl. 267-64.240.

Clark, Richard L., to American Multimedia, Inc. Method and apparatus for applying splicing tape with positive air pressure assist. 4,502,904, Cl. 156-157.000.

Clarke, Herbert E.; and Lampkin, Peter R., to Blounthurst Limited. Clip for securing hosepipes and like uses. 4,502,186, Cl. 24-16.0PB.

Clausen, Victor H.; and Asbury, Charles E., to H. B. Fuller Company. Reinforced paper product. 4,503,108, Cl. 428-108.000.

Cleland, Robert D.: *See*—
Golembeski, Nancy M.; Jorgensen, Robert J.; Cleland, Robert D.; and Noshay, Allen, 4,503,203, Cl. 526-159.000.

Clements, Harold J., to Modern Precision Engineers and Associates Limited. Containers. 4,502,519, Cl. 150-55.000.

Clermont, Michel: *See*—
Abiven, Henri; Beheydt, Andre ; Clermont, Michel; Delattre, Maurice; and Poubeau, Pierre, 4,502,349, Cl. 74-572.000.

Cleveland, Dixon: *See*—
Houchens, Albert F.; Decina, Basil A., Jr.; Havens, James R.; Cleveland, Dixon; and Nagel, Gregory L., 4,503,311, Cl. 219-109.000.

Cleverdon, Jo Ann, to Ciba-Geigy Corporation. Crown ether complexes of direct yellow 11 and dyestuff containing same. 4,502,864, Cl. 8-527.000.

Close, Leo R., to Israel, Mrs. Lawrence. Pneumatically releasable, tamper-resistant security tag. 4,502,717, Cl. 292-316.000.

Coal Industry (Patents) Limited: *See*—
Finn, Michael J.; and Hughes, Robert D., 4,502,940, Cl. 208-8.0LE.

Cogliano, Joseph A., to W. R. Grace & Co. Construction barrier board. 4,503,106, Cl. 428-40.000.

Cogliano, Joseph A., to W. R. Grace & Co. Construction barrier board. 4,503,107, Cl. 428-40.000.

Cohen, Lewis, to Venture Tape Corp. Laminated adhesive backing for mirrors. 4,503,114, Cl. 428-247.000.

Cohnen, Wolfgang: *See*—
Krishnan, Sivaram; Neuray, Dieter; Cohnen, Wolfgang; and Geisler, Klaus, 4,503,213, Cl. 528-199.000.

Colburn, Michael H.: *See*—
Marsh, Robert E.; and Colburn, Michael H., 4,502,953, Cl. 210-94.000.

Cole, Donald A.: *See*—
Morris, C. Carson; Bielsker, Barry H.; and Cole, Donald A., 4,503,287, Cl. 178-22.080.

Coleman Company, Inc., The: *See*—
Lundblade, Gene D., 4,502,715, Cl. 292-78.000.
Wiant, Morris N., 4,502,725, Cl. 296-181.000.

Collins, Jack L.: *See*—
Lloyd, Milton H.; Collins, Jack L.; and Shell, Sam E., 4,502,987, Cl. 252-635.000.

Collins, Michael T., to P and C Engineering and Development. Rotary face seal with flexible annular boot. 4,502,698, Cl. 277-43.000.

Colt Industries Operating Corp.: *See*—
Currier, Stephen M.; Penhollow, Bert G. H.; Hof, Gordon G.; and Mast, Norbert L., 4,502,842, Cl. 417-8.000.

Comb Associates: *See*—
Saferstein, Albert; and Spector, Gilbert, 4,502,498, Cl. 132-137.000.

Combe Incorporated: *See*—
Lapidus, Herbert, 4,503,116, Cl. 428-286.000.

Combustion Engineering, Inc.: *See*—
Ivester, Frank D.; and Troulias, James R., 4,502,872, Cl. 55-147.000.
Wheeler, Harry L., 4,502,870, Cl. 55-13.000.

Commer, Johann; Neuhaus, Wulf-Dieter; and Schmidt, Volkmar, to Ruhrchemie Aktiengesellschaft. Apparatus for heating or cooling and in particular for drying finely particulate solids. 4,502,230, Cl. 34-57.00E.

Commercial Enclosed Fuse Co. of NJ: *See*—
Rooney, William J.; and Rooney, Francis J., 4,503,415, Cl. 337-160.000.

Commissioner for Main Roads, The: *See*—
Scrivener, Stephen P.; Smith, Wallace D.; Mansell, Mark L.; and Campbell, Neville D., 4,502,327, Cl. 73-146.000.

Compagnie Francaise de Raffinage: *See*—
Bourgogne, Michel; Guth, Jean-Louis; and Wey, Raymond, 4,503,024, Cl. 423-328.000.

Compagnie Generale de Geophysique: *See*—
Beauducel, Claude; Cretin, Jacques; Ausset, Alain; and Ringot, Gabriel, 4,503,526, Cl. 367-20.000.

Comparetto, John E. Bone wedge guidance system. 4,502,474, Cl. 128-92.00H.

Condar Co.: *See*—
Barnett, Stockton G., 4,502,395, Cl. 110-214.000.

Congram, Sam R.: *See*—
Becker, Theodore, Jr.; Congram, Sam R.; and McClung, Carl L., 4,502,433, Cl. 123-188.00S.

Conner, William A.: *See*—
McClellan, W. Roy, III; Girvin, Richard J.; and Conner, William A., 4,503,562, Cl. 455-22.000.

Conoco Inc.: *See*—
Boyd, Phil A., 4,503,149, Cl. 435-39.000.
Shaw, Ricky L., 4,502,390, Cl. 104-245.000.

Consolidated Investments and Development Corp.: *See*—
Raab, Herman P., 4,503,431, Cl. 340-870.130.

Consortium Fur Elektrochemische Industrie GmbH: *See*—
Staiger, Gerhard; and Macri, Antonio, 4,503,240, Cl. 549-458.000.

Conti, Romano. Postal forms. 4,502,713, Cl. 283-1.00B.

Continental Plastic Containers, Inc.: *See*—
Szajna, John L., 4,502,607, Cl. 220-70.000.

Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Miller, Robert E.; Mudge, Ronald K.; Pace, Aldren M.; and Van Allen, Kent, to Scans Associates, Inc. Method and apparatus for calibrating flow meters. 4,502,318, Cl. 73-3.000.

Conway, Michael W., to Halliburton Company. Method and compositions for fracturing subterranean formations. 4,502,967, Cl. 252-8.55R.

Cook, Phillip D.; and McNamara, Dennis J., to Warner-Lambert Company. Process for producing 4-carbamoyl-1H-imidazolium-5-olate. 4,503,235, Cl. 548-301.000.

Coombe, Anthony J., to Du Pont de Nemours, E. I., and Company. Fluid energy mill with differential pressure means. 4,502,641, Cl. 241-5.000.

Cooper, George F. Lens support system. 4,502,765, Cl. 351-110.000.

Cooper Industries: *See*—
Lofstrand, Warren A., 4,503,411, Cl. 335-259.000.

Cooper Industries, Inc.: *See*—
Engel, Joseph C., 4,503,364, Cl. 315-308.000.

Cooper, Kelvin: *See*—
Richardson, Kenneth; and Cooper, Kelvin, 4,503,063, Cl. 514-383.000.

Cooper Vision, Inc.: *See*—
Graham, William M., 4,502,163, Cl. 3-13.000.

CooperVision, Inc.: *See*—
Gerhard, Gregory J.; Gornstein, Robert J.; Graham, William M.; Patel, Anilbhai S.; Smith, John M.; and Vaughn, Wade C., 4,502,162, Cl. 3-13.000.

Copal Company Limited: *See*—
Nakamori, Masao; and Ishiguro, Yasuo, 4,502,769, Cl. 354-152.000.

Copeland Corporation: *See*—
Bergman, Ernest R., 4,503,347, Cl. 310-68.00C.

Cordea, James N.; Jasper, Joseph C.; and Sheth, Harshad V., to Armco Inc. Austenitic stainless steel and drill collar. 4,502,886, Cl. 75-125.000.

Corley, Larry S., to Shell Oil Company. Heat curable polyepoxide resin blends. 4,503,200, Cl. 525-532.000.

Cornelius, Walter: *See*—
Klomp, Edward D.; and Cornelius, Walter, 4,502,635, Cl. 239-251.000.

Corning Glass Works: *See*—
Covington, Arthur K.; and Sibbald, Alastair, 4,502,938, Cl. 204-412.000.

Cornish, Anthony L.: *See*—
Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., 4,503,534, Cl. 371-9.000.
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Coseo, Mary: *See*—
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.

Cosse , Lionel, to Biscuiterie Nantaise—BN. Machine for making coated products such as biscuits or cookies. 4,502,376, Cl. 99-450.400.

Cottenceau, Remi: *See*—
Zurcher, Erwin; and Cottenceau, Remi, 4,502,902, Cl. 156-73.200.

Cotterill, Phillip J.: *See*—
Booker, David F.; Grove, David E.; Cotterill, Phillip J.; and Tyson, Robert G., 4,503,255, Cl. 568-17.000.

Coughlin, William J.; Rieppel, Perry J.; and Hoffman, Stephen A., to Arcair Company. Apparatus for collecting process generated fume and/or slag. 4,502,179, Cl. 15-322.000.

Coulson, Richard L.; Blickenstaff, Ronald L.; Dodd, P. David; Moreno, Robert J.; and Kinard, Dean P., to Storage Technology Corporation. Adaptive domain partitioning of cache memory space. 4,503,501, Cl. 364-300.000.

Couser, Chester F. Folding tool beam and lift assembly. 4,502,545, Cl. 172-311.000.

Cova, Dario R.: *See*—
Dyroff, David R.; Chou, Yueting; and Cova, Dario R., 4,502,923, Cl. 203-71.000.

Covington, Arthur K.; and Sibbald, Alastair, to Corning Glass Works. Encapsulated chemoresponsive microelectronic device arrays. 4,502,938, Cl. 204-412.000.

Cowan, Kiplin D.: *See*—
Masino, Albert P.; Cowan, Kiplin D.; and Hawley, Gil R., 4,503,159, Cl. 502-111.000.

Cox, Charles R. Plywood safety bar. 4,502,619, Cl. 224-311.000.

Cox, Raymond J.: *See*—
Calvin, Vaughn; and Cox, Raymond J., 4,502,851, Cl. 417-516.000.

Cramer, Paul W., Jr., to United States of America, National Aeronautics and Space Administration. Beam forming network. 4,503,436, Cl. 343-876.000.

Crass, Gunther; Janocha, Siegfried; Dietz, Wolfgang; and Bothe, Lothar, to Hoechst Aktiengesellschaft. Sealable polyolefinic multilayer film. 4,502,263, Cl. 53-396.000.

Crenshaw, Ronnie R.: *See*—
Algieri, Aldo A.; and Crenshaw, Ronnie R., 4,503,051, Cl. 514-183.000.

Creter, Frank E., Jr.; and Creter, Richard E., to Creter Vault Corp. Shoreline breakwater. 4,502,816, Cl. 405-30.000.

Creter, Richard E.: *See*—
Creter, Frank E., Jr.; and Creter, Richard E., 4,502,816, Cl. 405-30.000.

Creter Vault Corp.: *See*—
Creter, Frank E., Jr.; and Creter, Richard E., 4,502,816, Cl. 405-30.000.

Cretin, Jacques: *See*—
Beauducel, Claude; Cretin, Jacques; Ausset, Alain; and Ringot, Gabriel, 4,503,526, Cl. 367-20.000.

Crouch, William B.: *See*—
Jahnke, Frederick C.; Crouch, William B.; and Gulko, George M., 4,502,869, Cl. 48-197.00R.

Crowell, Douglas H.: *See*—
Gilbride, Andrew J.; Morse, Albert I.; Crowell, Douglas H.; and Holland, Larry L., 4,502,411, Cl. 118-503.000.

CTS Corporation: *See*—
Bleeke, William F.; and Greve, James E., 4,503,417, Cl. 338-176.000.

Cuan, Victor; McCaskill, Rex A.; Repass, James T.; and Shipp, Kenneth O., Jr., to International Business Machines Corporation. Footnote assembly management. 4,503,515, Cl. 364-900.000.

Cullen, Steven R., to Ag-Bag Corporation. Hydraulic reservoir for silage compression machines. 4,502,378, Cl. 100-65.000.

Cuneo, Guiseppe, to Black & Decker Inc. Electronic clutch for electric tools of selectable speed. 4,503,370, Cl. 318-331.000.

Currier, Stephen M.; Penhollow, Bert G. H.; Hof, Gordon G.; and Mast, Norbert L., to Colt Industries Operating Corp. Multiple compressor controller and method. 4,502,842, Cl. 417-8.000.

Curtis, Marvin R., Jr., to Miro Industries, Inc. Pipe supporting device. 4,502,653, Cl. 248-55.000.

Custom Creamery Systems, Inc.: *See*—
Hall, James F., Jr., 4,502,377, Cl. 99-492.000.

Cutters Exchange, Inc.: *See*—
Seaman, A. Matthew, 4,502,399, Cl. 112-121.270.

CVI Incorporated: *See*—
Brown, Richard A.; and Wilson, Richard K., 4,502,714, Cl. 285-47.000.

Cyklop International Emil Hoffman, KG: *See*—
Discavage, James L., 4,502,911, Cl. 156-499.000.

Dagna, Gian D.; and Buat, Mario, to Ing. C. Olivetti & C., S.p.A. Serial ink jet printing head. 4,503,443, Cl. 346-140.00R.

d'Agostino, Guy; Dhainaut, Andre ; and Maillard, Claude M. J., to S.N.E.C.M.A. Fuel control assembly incorporating an integral pressure drop monitor for use with a gas turbine plant. 4,502,501, Cl. 137-487.000.

Daicel Chemical Industries, Ltd.: *See*—
Mitani, Tadayuki; and Endo, Mamoru, 4,503,246, Cl. 562-531.000.
Tsuda, Kenji, 4,502,887, Cl. 106-93.000.

Daikin Kogyo Co., Ltd.: *See*—
Yoshimura, Tatsuhiro; Terada, Tsutomu; and Nakayama, Shozo, 4,503,179, Cl. 524-262.000.

Daimler-Benz Aktiengesellschaft: *See*—
Hafner, Gunther; Lenz, Hermann; and Finger, Helmut, 4,503,337, Cl. 290-4.00D.
Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.
Wawra, Helmut; and Schuliers, Wolfgang, 4,502,746, Cl. 339-3.00S.

Dainippon Screen Manufacturing Co., Ltd.: *See*—
Maeda, Kiyoshi, 4,502,757, Cl. 350-173.000.
Senga, Takao; Suzuki, Shigeyoshi; Yamada, Jun; and Kuriu, Sadao, 4,502,677, Cl. 271-104.000.

Dainippon Screen Seizo Kabushiki Kaisha: *See*—
Ikuta, Kunio; and Atoji, Hitomi, 4,503,457, Cl. 358-75.000.

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Harris, Norman; Dennis, Alan J.; and Harrison, George E., 4,503,275, Cl. 568-866.000.

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Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
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Wilson, Billy F., 4,503,327, Cl. 250-261.000.
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Ebner, Heinrich, to Heinrich Frings GmbH & Co. Kg. Process for the production of vinegar with more than 12 gms/100 ml acetic acid. 4,503,078, Cl. 426-17.000.

Eby, George A., III. Method for reducing the duration of the common cold. 4,503,070, Cl. 514-494.000.

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Fastritsky, Viktor S.; Vingris, Laimonis T.; Ardentov, Vasily V.; Florinsky, Jury B.; Plotnikov, Viktor I.; Rodnevsky, Leonid A.; and Alexeev, Gennady N., to Rizhsky Politekhnichesky Institut. Apparatus for non-destructive testing of spot welds using an electromagnetic field. 4,503,392, Cl. 324-232.000.
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Fife, James A., to Cabot Corporation. Method for producing fiber-shaped tantalum powder and the powder produced thereby. 4,502,884, Cl. 75-0.5AB.
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Fiore, Leonardo; Binaghi, Marco; and Bonicelli, Ugo, to Montedison S.p.A. Process for the preparation of mixes of acrylic rubbers with styrene/acrylonitrile copolymers, endowed with improved impact-resistant characteristics. 4,503,190, Cl. 525-108.000.
Fischer, Heinrich, to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co. Machine for the precision working of tooth surfaces of toothed workpieces. 4,502,822, Cl. 409-32.000.
Fischer, Horst: *See*—
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Flaherty, Anthony H. Film wrap machine. 4,502,264, Cl. 53-399.000.
Flam, Frederick H. Machine readable punch card. 4,503,323, Cl. 235-489.000.
Flander, Hans, to GMN Georg Muller Nurnberg GmbH. Roller bearing seal. 4,502,739, Cl. 384-481.000.
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Flocon, Alain, to Telecommunications Radioelectriques T.R.T. Termination device using a directional coupler which compensates for the

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Fourie, Theunis G.; Dekker, Theodor G.; Snyckers, Friedrich O.; and van der Schyf, Cornelis J., to Noristan Limited. Phlorophenone derivatives, processes for preparing such compounds, uses and pharmaceutical compositions of phlorophenone compounds. 4,503,256, Cl. 568-331.000.
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Frambach, James E., Sr. Tractor hitch frame. 4,502,706, Cl. 280-415.00A.
Frame, Robert R.; Johnson, Russell W.; and Staehle, Bruce E., to UOP Inc. Catalytic oxidation of mercaptan in petroleum distillate. 4,502,949, Cl. 208-207.000.
Francese, Renato; Fruttero, Roberta; Messori, Vittorio; and Peluffo, Anna, to ANIC S.p.A. Weed-killing furazan compounds. 4,502,881, Cl. 71-92.000.
Frank, Rudiger, to Robert Bosch GmbH. Vane pump with spring sealing elements against the vane faces. 4,502,856, Cl. 418-137.000.
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Friedson, Ronald S. Riding saddle construction. 4,502,266, Cl. 54-44.000.
Friemel, Wolfgang; and Ehret, Reiner, to Dr. Werner Freyberg Chemische Fabrik Delitia Nachf. Hydrogen-phosphide releasing compositions and their use. 4,503,032, Cl. 424-40.000.
Frissora, Anthony P.; and Kojak, Alexander T., to Allied Corporation. Chilled casting wheel. 4,502,528, Cl. 164-453.000.
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Fritz, Eberhard, to Robert Bosch GmbH. Method and system to recognize change in the storage characteristics of a programmable memory. 4,503,538, Cl. 371-28.000.
Fronk, Matthew H., to General Motors Corporation. Fuel injector governor. 4,502,440, Cl. 123-367.000.
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Fujii, Shuzo; Abe, Koichi; and Miwa, Hideo, to Denka Engineering Kabushiki Kaisha. Constant discharge device in a conveyor for powdery and granular materials. 4,502,819, Cl. 406-14.000.
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Fujiwara, Masatoshi: *See—*
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Fujiya, Sigeru; Tsubaki, Tohru; Amano, Naoki; Yaginuma, Kyuzi; Kayaba, Hitoshi; Aiko, Yoriyuki; and Takahashi, Takeshi, to Hitachi, Ltd. Gas insulated switchgear equipment. 4,503,481, Cl. 361-341.000.

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Irimajiri, Shoichiro; and Fukui, Takeo, 4,502,434, Cl. 123-193.00P.

Fukunaga, Shinobu: *See—*
Kyomasu, Mikio; Araki, Toshiyuki; Fukunaga, Shinobu; and Shindo, Masahiro, 4,503,520, Cl. 365-177.000.

Fukunaga, Tokio; Futakawa, Akemi; and Kiso, Mataichiro, to Mitsubishi Denki Kabushiki Kaisha. Method for checking insulative condition of insulated windings used in electrical appliances. 4,502,329, Cl. 73-573.000.

Fukushima, Isao: *See—*
Nishijima, Hideo; Fukushima, Isao; Teshima, Tsunehiko; Kobori, Yasunori; and Ito, Takayasu, 4,503,369, Cl. 318-254.000.

Fukushima, Naoto; Iwata, Kazuroh; and Hidaka, Kunihiko, to Nissan Motor Company, Limited. Shock absorber. 4,502,575, Cl. 188-282.000.

Fultz, Clinton: *See—*
Moore, Franklin, Jr.; and Fultz, Clinton, 4,502,623, Cl. 229-1.50B.

Funabashi, Shinichi: *See—*
Yamauchi, Koichi; Tsuji, Nobuo; Yamada, Yasuyuki; Funabashi, Shinichi; and Kiyama, Masatoshi, 4,503,120, Cl. 428-336.000.

Funai Yakuhin Kogyo Kabushiki Kaisha: *See—*
Fujii, Setsuro; Yasui, Bompei; Miyamoto, Tomohisa; Shiga, Masatoshi; Ando, Kazuko; Hashimoto, Iwao; Kawasaki, Masahiro; Kawai, Yoichiro; and Mino, Yuji, 4,503,045, Cl. 514-25.000.

Funazaki, Mitsunori: *See—*
Iwanami, Yoshiyuki; Taniguchi, Kozo; Funazaki, Mitsunori; and Takenouchi, Tomoo, 4,502,524, Cl. 164-66.100.

Furnari, Giuseppe, to Tonal S.a.S. di Furnari Giuseppe & C. Safety razor provided with an articulated head. 4,502,216, Cl. 30-50.000.

Furukawa, Hisao: *See—*
Kato, Yasushi; Furukawa, Hisao; and Nakatsuka, Saori, 4,503,181, Cl. 524-391.000.

Furuta, Mamoru: *See—*
Kobayashi, Kazuo; Furuta, Mamoru; and Maeno, Yoshio, 4,503,356, Cl. 313-634.000.

Furutachi, Nobuo; and Hirose, Takeshi, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive materials containing couplers with a hydroxyl substituted aromatic heterocyclic sulfonyl group in the ballast group. 4,503,141, Cl. 430-558.000.

Futakawa, Akemi: *See—*
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G & L Corporation: *See—*
Loechner, Steven R., 4,502,569, Cl. 187-17.000.

Gabriel Microwave Systems, Limited: *See—*
Sheridan, Richard B.; and Bogue, Robert W., 4,502,332, Cl. 73-661.000.

Gadd, Rolf K.; and Sund-Hagelberg, Anna C., to Boliden Aktiebolag. Method of purifying waste aqueous solutions from heavy metals. 4,503,017, Cl. 423-87.000.

Gaewsky, John P.; and Murray, Joseph E., Jr., to Polaroid Corporation. Two zone infrared ranging system. 4,502,773, Cl. 354-403.000.

Gale, James: *See—*
Serinken, Nur M.; Calder, Iain D.; Gale, James; and Fletcher, Norman C., 4,503,468, Cl. 358-256.000.

Gange, Toshihiko: *See—*
Sakai, Seiichi; Gange, Toshihiko; Tsukioka, Hideo; Sugawara, Katuo; Tani, Ichitaro; Mori, Etsunori; and Shiono, Shigeo, 4,502,320, Cl. 73-23.000.

Ganguly, Ashit K.: *See—*
Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; Pinto, Patrick A.; and Versace, Richard W., 4,503,064, Cl. 514-210.000.

Gardellini, Giovanni: *See—*
Bonfiglioli, Silverio; and Gardellini, Giovanni, 4,502,436, Cl. 123-339.000.

Gardner, Samuel A.; and Ban, Thomas E., to Davy McKee Corporation. Desulfurization of phosphogypsum. 4,503,018, Cl. 423-168.000.

Garford, Andrew M. Wheel motion indicator. 4,503,298, Cl. 200-61.390.

Garnett, Willard R.; and Scofield, Robert L., to Emerson Electric Co. Switching cable assembly. 4,502,744, Cl. 339-14.00R.

Garnier, Francis: *See—*
Gazard, Maryse; Tourillon, Gerard; and Garnier, Francis, 4,502,934, Cl. 204-242.000.

Garrett Corporation, The: *See—*
Klauss, Reinhard M.; and Suriano, Francis J., 4,502,795, Cl. 384-103.000.

Garthe, Horst: *See—*
Reim, Werner; and Garthe, Horst, 4,502,262, Cl. 53-157.000.

Garwood, Donald C.; and Kathiriya, Shiraz A., to Minnesota Mining and Manufacturing Company. Water-activated casting material. 4,502,479, Cl. 128-90.000.

Gas Research Institute: *See—*
Gerstmann, Joseph; and Vasilakis, Andrew D., 4,502,626, Cl. 236-20.00R.

Gasc, Jean-Claude: *See—*
Nedelec, Lucien; Gasc, Jean-Claude; and Fauveau, Patrick, 4,503,053, Cl. 514-239.000.

Gates, Guy W.; Bates, James F.; Larsen, John F.; and Law, Benjamin F. Third accumulator check valve. 4,502,351, Cl. 74-753.000.

Gaudiana, Russell A.; and Kalyanaraman, Palaiyur S., to Polaroid Corporation. Substituted-quaterphenylene monomers for the production of polyamides therefrom. 4,503,248, Cl. 564-307.000.

Gavrielides, Athanasios: *See—*
Peterson, Phillip R.; and Gavrielides, Athanasios, 4,502,756, Cl. 350-162.200.

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GCA Corporation: *See—*
Andersen, Ingar F.; Lutts, Timothy W.; and Lam, Eddie W., 4,502,871, Cl. 55-82.000.

Geary, Carl H., to Carrier Corporation. Method and apparatus for controlling thermal growth. 4,502,809, Cl. 403-28.000.

Gebben, Vernon D., to International Harvester Company. Torque sensor for shafts. 4,502,340, Cl. 73-862.330.

Gefra B.V.: *See—*
Sijbrandij, George, 4,502,594, Cl. 198-836.000.

Geigert, John; and Neidleman, Saul L., to Cetus Corporation. Method for producing aldehydes from primary alcohols. 4,503,153, Cl. 435-147.000.

Geisler, Klaus: *See—*
Krishnan, Sivaram; Neuray, Dieter; Cohnen, Wolfgang; and Geisler, Klaus, 4,503,213, Cl. 528-199.000.

Geissler, Klaus H., to Licentia Patent-Verwaltungs-GmbH. Arrangement for carrying electrical and/or electronic components. 4,503,485, Cl. 361-424.000.

Gemmell, Leslie W. Device for destroying bacterial flora. 4,502,164, Cl. 4-191.000.

General Dynamics: *See—*
Panzer, Gary W., 4,503,536, Cl. 371-25.000.

General Dynamics, Pomona Division: *See—*
Yueh, William R., 4,502,650, Cl. 244-3.150.

General Electric Company: *See—*
Bennett, James G., Jr.; Tungate, Freddie L.; and Kokoszka, John J., 4,503,272, Cl. 568-804.000.
Blair, Lawrence W.; and Bryans, Alexander C., 4,502,837, Cl. 415-198.100.
Ching, Ta-Yen, 4,503,180, Cl. 524-293.000.
Englund, Arvid E., Jr., 4,503,402, Cl. 331-36.00C.
Keane, John J.; and Pauze, Denis R., 4,503,124, Cl. 428-372.000.
Kim, Wontaik, 4,503,416, Cl. 338-99.000.
Lucas, Gary M., 4,503,209, Cl. 528-18.000.
Madden, James A.; and LeDuc, Kenneth C., 4,502,213, Cl. 29-730.000.
Soules, Thomas F.; and Vukcevich, Milan R., 4,503,488, Cl. 362-80.000.
Talley, John J., 4,503,270, Cl. 568-783.000.
White, Dwain M.; and Nye, Susan A., 4,503,214, Cl. 528-212.000.
Williams, Robert E., Jr., 4,503,160, Cl. 502-158.000.

General Foods Corporation: *See—*
Glicksman, Martin; Frost, John R.; Silverman, Jerry E.; and Hegedus, Elizabeth, 4,503,083, Cl. 426-553.000.

General Motors Corporation: *See—*
Brann, David E., 4,502,422, Cl. 123-41.350.
Chana, Howard E., 4,502,845, Cl. 417-288.000.
Fronk, Matthew H., 4,502,440, Cl. 123-367.000.
Fuehrer, Reece R., 4,502,279, Cl. 60-330.000.
Houchens, Albert F.; Decina, Basil A., Jr.; Havens, James R.; Cleveland, Dixon; and Nagel, Gregory L., 4,503,311, Cl. 219-109.000.
Jones, Richard A.; and Reoch, William D., 4,503,378, Cl. 320-20.000.
Kabasin, Daniel F.; and Stoltman, Donald, 4,502,453, Cl. 123-575.000.
Kidd, Robert C.; and Porn, Lawrence J., 4,503,419, Cl. 340-59.000.
Kirk, Thomas E., 4,503,365, Cl. 315-310.000.
Klomp, Edward D., 4,502,325, Cl. 73-118.000.
Klomp, Edward D.; and Cornelius, Walter, 4,502,635, Cl. 239-251.000.
Nagy, Louis L.; and O'Rourke, Michael J., 4,503,384, Cl. 324-61.00P.
Paar, Michael S., 4,502,428, Cl. 123-90.460.
Pogue, Russell W., Jr., 4,503,513, Cl. 364-900.000.
Polak, James C., 4,502,350, Cl. 74-730.000.
Pozniak, Donald J.; Robertson, Gerald F.; and McClain, Michael J., 4,502,847, Cl. 417-380.000.
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Schultz, Frederick K., 4,503,397, Cl. 328-138.000.
Shields, William A., 4,502,516, Cl. 141-290.000.
Shows, Everett W., 4,502,827, Cl. 414-217.000.
Stark, Terrence L., 4,502,278, Cl. 60-303.000.
Stephenson, Ronald L.; and Beer, Arthur G., 4,502,659, Cl. 249-66.00R.
Wandel, David M., 4,502,283, Cl. 60-609.000.

General Scanning, Inc.: *See—*
Montagu, Jean I., 4,502,752, Cl. 350-6.600.

General Tire & Rubber Company, The: *See—*
Bingham, Robert E.; Durst, Richard R.; Fabris, Hubert J.; Hargis, Ivan G.; Livigni, Russell A.; and Aggarwal, Sundar L., 4,503,204, Cl. 526-187.000.

Georg Spiess GmbH: *See—*
Marass, Josef, 4,502,678, Cl. 271-270.000.

Georgis, Steven P.: *See—*
Zweighaft, James; and Georgis, Steven P., 4,502,647, Cl. 242-191.000.

Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, to BTC Diagnostics Limited Partnership. Enzyme immunoassay with two-part solution of tetramethylbenzidine as chromogen. 4,503,143, Cl. 435-7.000.

Gerber, Ernst W.: *See—*
Young, William E.; Gerber, Ernst W.; and Pasco, William R., 4,502,906, Cl. 156-251.000.

Gerber, Hans; Hidveghy, Ivan; Schaal, Gunter; Sturmer, Marian; Vogel, Eberhard; and Wessel, Claude, to Robert Bosch GmbH. Indicating arrangement for portable electric devices. 4,503,425, Cl. 340-680.000.

Geren, George W.: *See—*
Miles, Ronald C.; Geren, George W.; and Peel, R. W., 4,502,214, Cl. 29-859.000.

Gerhard, Gregory J.; Gornstein, Robert J.; Graham, William M.; Patel, Anilbhai S.; Smith, John M.; and Vaughn, Wade C., to CooperVision, Inc. Haptic for intraocular lens. 4,502,162, Cl. 3-13.000.

Gerstmann, Joseph; and Vasilakis, Andrew D., to Gas Research Institute. Combustion product condensing water heater. 4,502,626, Cl. 236-20.00R.

GFO Gesellschaft Fer Oberflachentechnik mbH: *See—*
Breuninger, Axel; Pollmann, Richard; and Scheyrer, Peter, 4,503,094, Cl. 427-250.000.

Gg. Noell GmbH: *See—*
Krieger, Friedrich; and Klemm, Norbert, 4,502,245, Cl. 49-193.000.

Ghelardoni, Mario: *See—*
Pestellini, Vittorio; Ghelardoni, Mario; Giannotti, Danilo; Giolitti, Alessandro; Maggi, Carlo A.; Manzini, Stefano; Grimaldi, Guglielmo; and Meli, Alberto, 4,503,075, Cl. 514-622.000.

Giacobbe, Thomas J.; Williams, Thomas N., Jr.; and Horn, James M., to Rhone-Poulenc, Inc. Solvent and catalyst recovery and recycle in the manufacture of phenoxybenzoic acid derivatives. 4,503,245, Cl. 562-414.000.

Giampapa, Vincent C.; and Peck, George C. Nasal surgical saw. 4,502,484, Cl. 128-317.000.

Giannotti, Danilo: *See—*
Pestellini, Vittorio; Ghelardoni, Mario; Giannotti, Danilo; Giolitti, Alessandro; Maggi, Carlo A.; Manzini, Stefano; Grimaldi, Guglielmo; and Meli, Alberto, 4,503,075, Cl. 514-622.000.

Giddings, David M.; Ries, Donald G.; and Syrinek, Allen R., to Nalco Chemical Company. Terpolymers for use as high temperature fluid loss additive and rheology stabilizer for high pressure, high temperature oil well drilling fluids. 4,502,964, Cl. 252-8.50C.

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Gilbert, Jack J. Method and apparatus for vaporizing fuel by centrifugal action. 4,503,003, Cl. 261-51.000.

Gilbert, Robert W.: *See—*
Treloar, Howard A.; and Gilbert, Robert W., 4,502,701, Cl. 277-92.000.

Gilbride, Andrew J.; Morse, Albert I.; Crowell, Douglas H.; and Holland, Larry L., to USM Corporation. Clamping mechanism for a powder reinforcing machine. 4,502,411, Cl. 118-503.000.

Gilbride, Andrew J.: *See—*
Elliott, Richard M.; Holland, Larry L.; Gilbride, Andrew J.; Gilligan, Thomas J., III; Ciccia, Lawrence P.; and Martin, John F., 4,503,091, Cl. 427-180.000.

Gilligan, Thomas J., III: *See—*
Elliott, Richard M.; Holland, Larry L.; Gilbride, Andrew J.; Gilligan, Thomas J., III; Ciccia, Lawrence P.; and Martin, John F., 4,503,091, Cl. 427-180.000.

Giolitti, Alessandro: *See—*
Pestellini, Vittorio; Ghelardoni, Mario; Giannotti, Danilo; Giolitti, Alessandro; Maggi, Carlo A.; Manzini, Stefano; Grimaldi, Guglielmo; and Meli, Alberto, 4,503,075, Cl. 514-622.000.

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Girault, Daniel G., to S.N.E.C.M.A. Lubricating and cooling system for intershaft bearing of turbojet. 4,502,274, Cl. 60-39.080.

Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; Pinto, Patrick A.; and Versace, Richard W., to Schering Corporation. Oxime substituted penems. 4,503,064, Cl. 514-210.000.

Giroflex Entwicklungs AG: *See—*
Locher, Hermann, 4,502,729, Cl. 297-301.000.

Girvin, Richard J.: *See—*
McClellan, W. Roy, III; Girvin, Richard J.; and Conner, William A., 4,503,562, Cl. 455-22.000.

Glassman, Jacob A. Super-fast-starting-sustained release tablet. 4,503,031, Cl. 424-15.000.

Glicksman, Martin; Frost, John R.; Silverman, Jerry E.; and Hegedus, Elizabeth, to General Foods Corporation. High quality, reduced-calorie cake. 4,503,083, Cl. 426-553.000.

GMN Georg Muller Nurnberg GmbH: *See—*
Flander, Hans, 4,502,739, Cl. 384-481.000.

Gnehm, Rene ; and Weber, Rolf, to Siegfried Aktiengesellschaft. Method for the production of acemetacin. 4,503,237, Cl. 548-501.000.

Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., to Gosudarstvenny Proektny I Konstruktorsky Institut Sojuzprommekhanizatsia. Conveyor roller and method of manufacture thereof. 4,502,310, Cl. 72-69.000.

Goebel, Gunther R.; and Hall, Richard G., to Allied Corporation. Gas hook-up to a ladle. 4,502,670, Cl. 266-220.000.

Goerings, Wilhelm: *See—*
Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, 4,502,642, Cl. 241-79.100.

Goetze AG: *See—*
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Goff, Randall: *See—*
Gorgens, Joseph E.; Goff, Randall; and Sardi, Stephen G., 4,502,334, Cl. 73-705.000.

Goin, Cheryl A.: *See—*
Ballard, Philip D.; Goin, Cheryl A.; Josephson, Paul J.; Keller, Andrew D.; Lykins, Larry W.; and Miller, Jeffrey J., 4,502,514, Cl. 141-1.000.

Golberg, Boris S.: *See—*
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Goldbecker, Wilfried, to Kochs Adler AG. Throat plate for a double lockstitch automatic sewing arrangement. 4,502,398, Cl. 112-121.120.

Goldberg, Lew: *See—*
Taylor, Henry F.; Goldberg, Lew; Rauscher, Christen; and Weller, Joseph F., 4,503,403, Cl. 331-37.000.
Weller, Joseph F.; and Goldberg, Lew, 4,503,541, Cl. 372-50.000.

Golembeski, Nancy M.; Jorgensen, Robert J.; Cleland, Robert D.; and Noshay, Allen, to Union Carbide Corporation. Preparation of granular steroregular butene-1 polymers in a fluidized bed. 4,503,203, Cl. 526-159.000.

Golias, Tipton L.; and Mostyn, William T., Jr., to Helena Laboratories Corporation. Method and apparatus for automated determination of hemoglobin species. 4,502,786, Cl. 356-435.000.

Gonas, Albert J., to Voplex Corporation. Mount for automotive loop strap that pivots on horizontal axis. 4,502,181, Cl. 16-126.000.

Goodyear Tire & Rubber Company, The: *See—*
Hinks, William L., 4,502,857, Cl. 425-29.000.
Sandstrom, Paul H., 4,502,520, Cl. 152-330.00R.

Gorgens, Joseph E.; Goff, Randall; and Sardi, Stephen G., to Dresser Industries, Inc. Combined pressure gauge-transmitter. 4,502,334, Cl. 73-705.000.

Gornstein, Robert J.: *See—*
Gerhard, Gregory J.; Gornstein, Robert J.; Graham, William M.; Patel, Anilbhai S.; Smith, John M.; and Vaughn, Wade C., 4,502,162, Cl. 3-13.000.

Gosadarstvenny Sojuzny Nauchno-Issledovatelsky Traktorny Institut: *See—*
Dubrovsky, Evgeny V.; Dunaev, Viktor P.; and Kuzin, Anatoly I., 4,502,315, Cl. 72-385.000.

Gossett, Ernest W., Jr.: *See—*
Lau, Anthony S. Y.; and Gossett, Ernest W., Jr., 4,502,783, Cl. 356-152.000.

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Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.

Goto, Kunio: *See—*
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Goto, Teruhisa: *See—*
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Gottfried Bischoff Bau kompl. Gasreinigungs- und Wasserruckkuhlanlagen GmbH & Co. Kommanditgesellschaft: *See—*
Weissert, Helmut; and Hegemann, Karl-Rudolf, 4,503,020, Cl. 423-242.000.

Gowda, Hanumaiah L.; and Raj, Kuldip, to Ferrofluidics Corporation. Ferrofluid linear seal apparatus. 4,502,700, Cl. 277-80.000.

Gower, David, to McDonnell Douglas Corporation. Portable weighing system for aircraft. 4,502,555, Cl. 177-25.000.

Goy, Pierre, to Jean Lassale S.A. Water-resistant device between an outside control member and a watch case. 4,502,791, Cl. 368-289.000.

Grabner, Christian: *See—*
Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.

Gradl, Reinhard: *See—*
Schimmel, Gunther; Krause, Werner; and Gradl, Reinhard, 4,503,016, Cl. 423-24.000.

Graf, Matthew C.: *See—*
DasGupta, Sumit; Graf, Matthew C.; Rasmussen, Robert A.; and Williams, Thomas W., 4,503,386, Cl. 324-73.00R.

Graham, William M., to Cooper Vision, Inc. Haptic for intraocular lens. 4,502,163, Cl. 3-13.000.

Graham, William M.: *See—*
Gerhard, Gregory J.; Gornstein, Robert J.; Graham, William M.; Patel, Anilbhai S.; Smith, John M.; and Vaughn, Wade C., 4,502,162, Cl. 3-13.000.

Grahn, Per G., to United Stirling AB. Protective shield for a solar energy concentrator. 4,502,466, Cl. 126-418.000.

Grant, Callum, to Koolflo Limited. Apparatus for cooling liquids. 4,502,294, Cl. 62-389.000.

Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., to Standard Oil Company (Indiana). Process for the manufacture of acrylonitrile and methacrylonitrile. 4,503,001, Cl. 260-465.300.

Gravestock, Michael B., to Imperial Chemical Industries PLC. Azolyl:-substituted alicyclic alcohols. 4,503,062, Cl. 514-383.000.

Gravity Guidance, Inc.: *See*—
Miller, Jack V., 4,502,682, Cl. 272-144.000.

Gray, Thomas J.; Masse, Norman G.; and Hagstrom, Richard A., to Olin Corporation. Raney nickel catalysis of aromatic amines. 4,503,251, Cl. 564-450.000.

Green, Joseph, to FMC Corporation. Cyclic phosphine oxides and their use as flame retardants in styrene modified polyphenylene ether resins. 4,503,178, Cl. 524-116.000.

Gregory, Willis H. Method and apparatus for efficiently capturing and distributing heat produced by gas logs. 4,502,463, Cl. 126-121.000.

Grenadier, R. Miles. Vehicle payload lightener. 4,502,724, Cl. 296-1.00S.

Greschner, Johann: *See*—
Trumpp, Hans-Joachim; and Greschner, Johann, 4,502,914, Cl. 156-643.000.

Greve, James E.: *See*—
Bleeke, William F.; and Greve, James E., 4,503,417, Cl. 338-176.000.

Greynolds, Fred L.: *See*—
Whiteside, Robert C.; Greynolds, Fred L.; and Arends, Albert W., 4,502,588, Cl. 198-409.000.

Grieger, Gene R.: *See*—
Windawi, Hassan; Grieger, Gene R.; and Oakdale, Warren R., 4,503,162, Cl. 502-174.000.

Griffin, Alan, to Horwood Bagshaw Limited. Agricultural cultivator and tines therefor. 4,502,548, Cl. 172-705.000.

Griffith, Vernon D.: *See*—
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Grigsby, Robert A., Jr.: *See*—
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Grimaldi, Guglielmo: *See*—
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Grincell, Ann, executrix: *See*—
DeLuccia, Victor C., deceased; DeLuccia, Nancy, executrix; Grincell, Ann, executrix; and Kolodziejcuk, Henriette, executrix, 4,502,482, Cl. 128-207.150.

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Grove, David E.: *See*—
Booker, David F.; Grove, David E.; Cotterill, Phillip J.; and Tyson, Robert G., 4,503,255, Cl. 568-17.000.

Grubb, James R., to Tetra Systems, Inc. Oil mining configuration. 4,502,733, Cl. 299-2.000.

Grunewald, Rudolf. Wire bending machine. 4,502,307, Cl. 72-22.000.

Grupping, Arnold W. Method for the underground gasification of coal or browncoal. 4,502,539, Cl. 166-262.000.

Gryaznov, Mikhail I.: *See*—
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GTE Automatic Electric Inc.: *See*—
Edwards, Ivan L.; McLaughlin, Robert C.; and Macrander, Max S., 4,503,400, Cl. 331-1.00A.

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Cheney, Richard F., 4,502,885, Cl. 75-0.50B.

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Gunesin, Binnur Z.; and Kawczak, Alex W., to Mobil Oil Corporation. P-Methylstyrene copolymer blends. 4,503,187, Cl. 525-71.000.

Gunzenhauser, Sigmund: *See*—
Balli, Heinz; Gunzenhauser, Sigmund; Fletcher, Ian J.; and Bedekovic, Davor, 4,503,227, Cl. 544-246.000.

Gupton, B. Franklin; and Little, Edwin D., to Virginia Chemicals, Inc. Process for the production of 2,6-diisopropylnaphthalene dihydroperoxide. 4,503,262, Cl. 568-575.000.

Guth, Jean-Louis: *See*—
Bourgogne, Michel; Guth, Jean-Louis; and Wey, Raymond, 4,503,024, Cl. 423-328.000.

Gypsy Pan Limited: *See*—
Kelz, Reinhard, 4,502,460, Cl. 126-29.000.

H. B. Fuller Company: *See*—
Clausen, Victor H.; and Asbury, Charles E., 4,503,108, Cl. 428-108.000.

Haapala, Ray. Fishing reel with adjustable let-off limit. 4,502,241, Cl. 43-20.000.

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Habluetzel, Hans, to Bobst SA. Method and device for changing printing elements in a printing unit of a press. 4,502,384, Cl. 101-153.000.

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Phillips, Richard A.; and Haddad, Theodore A., 4,503,126, Cl. 428-412.000.

Haden Schweitzer Corporation: *See*—
Donahue, Joseph D., 4,502,410, Cl. 118-429.000.

Haendle, Joerg; and Maass, Wolfgang, to Siemens Aktiengesellschaft. X-Ray diagnostic installation for providing subtraction images. 4,503,459, Cl. 358-111.000.

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Haessler, Heinrich: *See*—
Kippenberg, Horst; Haessler, Heinrich; and Huehnlein, Manfred, 4,503,010, Cl. 419-27.000.

Hafele KG: *See*—
Nock, Hans, 4,502,810, Cl. 403-231.000.

Hafner, Gunther; Lenz, Hermann; and Finger, Helmut, to Daimler-Benz Aktiengesellschaft. Power supply system for heat and electricity. 4,503,337, Cl. 290-4.00D.

Hafner, Udo; Hans, Waldemar; Krauss, Rudolf; and Sauer, Rudolf, to Robert Bosch GmbH. Electromagnetically actuatable valve, in particular a fuel injection valve for fuel injection systems. 4,502,632, Cl. 239-125.000.

Haga, Nobuhiro: *See*—
Kamata, Susumu; Matsui, Takeaki; and Haga, Nobuhiro, 4,502,989, Cl. 260-239.570.

Hagstrom, Richard A.: *See*—
Gray, Thomas J.; Masse, Norman G.; and Hagstrom, Richard A., 4,503,251, Cl. 564-450.000.

Hahn, Ralf, to Veith Pirelli, A.G. Arrangement for securing a flexible web to a walling means. 4,502,256, Cl. 52-63.000.

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Ogata, Hisanao; Nemoto, Takeo; Hakuraku, Yoshinori; and Yagi, Yasuomi, 4,502,296, Cl. 62-514.00R.

Halbritter, Klaus: *See*—
Sauer, Wolfgang; Halbritter, Klaus; and Engelbach, Heinz, 4,503,261, Cl. 568-471.000.

Halcon SD Group, Inc., The: *See*—
Khoobiar, Sargis, 4,503,247, Cl. 562-535.000.

Hall, Gardner L. Tape cleaner. 4,503,475, Cl. 360-137.000.

Hall, George R., II, to Babcock & Wilcox Company, The. Temperature-actuated flow control device. 4,502,341, Cl. 73-863.010.

Hall, James F., Jr., to Custom Creamery Systems, Inc. Safety system for apparatus for processing frozen comestibles. 4,502,377, Cl. 99-492.000.

Hall, John B.; and Sprecker, Mark A., to International Flavors & Fragrances Inc. Process for preparing 1(4-pentenoyl)-3,3-dimethylcyclohexane and intermediates used in said process. 4,503,258, Cl. 568-376.000.

Hall, Richard G.: *See*—
Goebel, Gunther R.; and Hall, Richard G., 4,502,670, Cl. 266-220.000.

Hall, Robert J., to Wiggins Teape Group Limited. Apparatus for the spark perforation of sheet materials. 4,503,318, Cl. 219-384.000.

Halliburton Company: *See*—
Conway, Michael W., 4,502,967, Cl. 252-8.55R.
Harmon, Bobby R., 4,502,963, Cl. 252-8.50P.
Neufeld, Jacob, 4,503,328, Cl. 250-262.000.

Halliburton Services: *See*—
Carter, Ernest E., Jr., 4,502,537, Cl. 166-162.000.

Hamai, Kyugo; Nakai, Meroji; Inoue, Ryusaburo; and Nakagawa, Yasuhiko, to Nissan Motor Company, Limited. Ignition system for an internal combustion engine. 4,502,454, Cl. 123-597.000.

Hamberger, Helmut: *See*—
Fliri, Hans; and Hamberger, Helmut, 4,503,221, Cl. 544-27.000.

Hambrecht, Juergen: *See*—
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Hamilton, Charles H.; and Puhaczewski, Paul R., to Rockwell International Corporation. Method of removing formed parts from a die. 4,502,309, Cl. 72-60.000.

Hamilton, Stephen P.; and McFarland, Harry G., to Texas Instruments Incorporated. Non-volatile memory system. 4,503,494, Cl. 364-200.000.

Hammann, Ingeborg: *See*—
Maurer, Fritz; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,503,057, Cl. 514-269.000.

Hanajima, Mitsuru; Yamamoto, Yoshinori; and Matsumoto, Yasushi, to Sony Corporation. Control arrangement for electronic appliance. 4,503,471, Cl. 360-69.000.

Hancock, Harvey G.; and Szymanski, Michael E., to AT&T Technologies, Inc. Cable stub assembly and methods of making. 4,503,283, Cl. 174-22.00R.

Hanlet, Jacques M., to Intent Patent A.G. Electronic ballast system. 4,503,361, Cl. 315-221.000.

Hanlet, Jacques M., to Intent Patent A.G. Frequency stabilized, gain controlled ballast system. 4,503,362, Cl. 315-221.000.

Hans, Waldemar: *See*—
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Hansen, Gerald D., to Atlantic Richfield Company. Purification of secondary recovery waterflood liquids. 4,502,959, Cl. 210-705.000.

Hansen, Loren F.; and Hicks, John E., to Outboard Marine Corporation. Rear discharge multi-blade rotary mower. 4,502,271, Cl. 56-320.100.

Hara, Kenkichi; Yokoe, Shigeo; Oka, Kazuyoshi; Murakami, Tamotsu; and Hashimoto, Tsugifusa, to Kanto Denka Kogyo Co., Ltd.; and Tokyo Shibaura Denki Kabushiki Kaisha. Two-component resin system of acrylic and diene polymers for coating electrophotographic carrier particles. 4,503,136, Cl. 430-106.600.

Harder, W. Dale. Seal retainer installing and removing tool. 4,502,197, Cl. 29-259.000.

Hardman, Harley F.: *See*—
Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., 4,503,001, Cl. 260-465.300.

Hare, Harold L.; and Bell, John M., to Safe-T-Frezz, Inc. Refrigeration system alarm device. 4,502,287, Cl. 62-126.000.

Hareyama, Kyuichi; Shiraki, Kenji; and Ryu, Kazuo, to Nippon Electric Co., Ltd. Digital to analog converter. 4,503,421, Cl. 340-347.0DA.

Hargis, Ivan G.: *See*—
Bingham, Robert E.; Durst, Richard R.; Fabris, Hubert J.; Hargis, Ivan G.; Livigni, Russell A.; and Aggarwal, Sundar L., 4,503,204, Cl. 526-187.000.

Hargreaves, Rodney B.: *See*—
Brown, David; Dowell, Robert I.; Hargreaves, Rodney B.; and Main, Brian G., 4,503,054, Cl. 514-242.000.

Harkness, Scott A.: *See*—
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Harmon, Bobby R., to Halliburton Company. Use of certain materials as thinners in oil based drilling fluids. 4,502,963, Cl. 252-8.50P.

Harmon, Raymond E.; and Poe, Lloyd R., to Hartwell Corporation. Stand-off fastener. 4,502,193, Cl. 24-621.000.

Harms, Wolfgang; Kuth, Robert; and Wunderlich, Klaus, to Bayer Aktiengesellschaft. Halogenotriazinyl dyestuffs. 4,503,224, Cl. 544-187.000.

Harris Corporation: *See*—
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Harris, John D.; and Evans, Mervyn, to National Research Development Corp. Apparatus for external fixation of bone fractures. 4,502,473, Cl. 128-92.00A.

Harris, Martin, to Shell Oil Company. Pesticidal nitromethane derivatives. 4,503,222, Cl. 544-54.000.

Harris, Norman; Dennis, Alan J.; and Harrison, George E., to Davy McKee (London) Limited. Production of butane-1,4-diol. 4,503,275, Cl. 568-866.000.

Harris, Robert A.: *See*—
White, James E.; Lobanoff, Mark; and Harris, Robert A., 4,502,674, Cl. 296-37.160.

Harrison, George E.: *See*—
Harris, Norman; Dennis, Alan J.; and Harrison, George E., 4,503,275, Cl. 568-866.000.

Harrison, Stephen J.; and Brown, Peter E., to Jebron Limited. Door control device having piston assembly with separately formed rack. 4,502,180, Cl. 16-52.000.

Hart-Carter Company: *See*—
Jones, Dennis J.; Scheidenhelm, Earl L.; and Truckenbrod, Thomas G., 4,502,493, Cl. 130-24.000.

Hartsing, Tyler F., Jr., to Union Carbide Corporation. Cookware made from polyarylethersulfone. 4,503,168, Cl. 523-100.000.

Hartwell Corporation: *See*—
Harmon, Raymond E.; and Poe, Lloyd R., 4,502,193, Cl. 24-621.000.

Hasegawa, Shumpei; and Yamato, Akihiro, to Honda Giken Kogyo Kabushiki Kaisha. Air/fuel ratio control method having fail-safe function for abnormalities in oxygen concentration detecting means for internal combustion engines. 4,502,443, Cl. 123-440.000.

Hasegawa, Shumpei: *See*—
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Hashiguchi, Don H.; Dietrich, Ronald J.; and Schoepe, George P., to SCM Corporation. Cupreous catalyst and process for making same. 4,503,165, Cl. 502-225.000.

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Fujii, Setsuro; Yasui, Bompei; Miyamoto, Tomohisa; Shiga, Masatoshi; Ando, Kazuko; Hashimoto, Iwao; Kawasaki, Masahiro; Kawai, Yoichiro; and Mino, Yuji, 4,503,045, Cl. 514-25.000.

Hashimoto, Shintaro; Kotani, Yasuhiro; and Fujikawa, Yoshiyuki, to Sharp Kabushiki Kaisha. Running display device implemented with a CPU. 4,503,428, Cl. 340-792.000.

Hashimoto, Tsugifusa: *See*—
Hara, Kenkichi; Yokoe, Shigeo; Oka, Kazuyoshi; Murakami, Tamotsu; and Hashimoto, Tsugifusa, 4,503,136, Cl. 430-106.600.

Haskel, Inc.: *See*—
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Hatahira, Seiichi, to Ina Seito Co., Ltd. Sintered apatite bodies and composites thereof. 4,503,157, Cl. 501-1.000.

Hatfield, Lowell D., to Eli Lilly and Company. Oxidation process. 4,502,988, Cl. 260-239.100.

Hatheway, Alson E.: *See*—
Fjeldsted, Thomas P.; and Hatheway, Alson E., 4,502,751, Cl. 350-6.400.

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Hatta, George: *See*—
Ohura, Yukio; Hatta, George; and Nogawa, Tadao, 4,502,740, Cl. 29-148.460.

Hattori, Shigenori, to Brother Kogyo Kabushiki Kaisha. Reversible ink ribbon feed mechanism. 4,502,803, Cl. 400-219.200.

Haug, Theobald: *See*—
Darms, Roland; Haug, Theobald; and Beyeler, Harry, 4,503,285, Cl. 174-68.500.

Haugh, Charles E.: *See*—
Mrenna, Stephen A.; Thomas, Glenn R.; and Haugh, Charles E., 4,503,408, Cl. 335-35.000.

Hauni-Werke Korber & Co. KG: *See*—
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von Wichert, Nils; and Schwenke, Dieter, 4,502,908, Cl. 156-350.000.

Hausman, Mary L.; Miller, Gerald D.; and Wempe, Lawrence K., to Air Products and Chemicals, Inc. Vinyl acetate/ethylene copolymer emulsions for paper coating compositions. 4,503,185, Cl. 524-553.000.

Havens, James R.: *See*—
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Haviv, Fortuna; and Walters, Roland L., to Abbott Laboratories. 1-(Pyridazinyl)pyrazoline derivatives. 4,503,056, Cl. 514-252.000.

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Hawkins, John W.: *See*—
Zucker, Jerry; Hawkins, John W.; and O'Brien, John J., 4,502,364, Cl. 87-8.000.

Hawley, Gil R.: *See*—
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Haworth, Brian D.; and Malek, Edward J., to S. C. Johnson & Son, Inc. Vapor-dispensing device. 4,502,630, Cl. 239-34.000.

Hayakawa, Kiyoshi: *See*—
Yumoto, Takaari; Hayakawa, Kiyoshi; Kawase, Kaoru; Yamakita, Hiromi; and Taoda, Hiroshi, 4,502,930, Cl. 204-160.100.

Hayashi, Asao: *See*—
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Hayashi, Jun: *See*—
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Hayashi, Takeshi: *See*—
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Hayashi, Yoshikazu: *See*—
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Hayatsu, Kazuo: *See*—
Ueno, Katsuji; Sugimoto, Hiroaki; and Hayatsu, Kazuo, 4,503,005, Cl. 264-102.000.

Hayes, Michael H.; and Pearson, Ernest J., to Chloride Group Public Limited Company. Assembling electric storage batteries and a clamp therefor. 4,502,211, Cl. 29-623.100.

Hayes, Patrick D.: *See*—
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Hayes, Richmond S., Jr.: *See*—
Shelton, Edward B.; Hayes, Richmond S., Jr.; and Kozlowski, Robert M., 4,502,291, Cl. 62-285.000.

Hayfield, Peter C. S., to IMI Kynoch Limited. Electrode and electrolytic cell. 4,502,936, Cl. 204-290.00F.

Hayman, Dennis J., to United States Brass Corporation. Single handle faucet valve. 4,502,507, Cl. 137-625.400.

Haynes, John L., to Becton, Dickinson and Company. Apparatus and method for regulating sheath fluid flow in a hydrodynamically focused fluid flow system. 4,503,385, Cl. 324-71.400.

Hazaki, Eiichi, to Hitachi, Ltd. Oil feeding device for scroll fluid apparatus. 4,502,852, Cl. 418-55.000.

Head Computer Products, Inc.: *See*—
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Health Care Concepts, Inc.: *See*—
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Hearn, Daniel P., to Atlantic Richfield Company. Determining level or tilt angle of solids in a rotatable chamber. 4,503,330, Cl. 250-357.100.

Heath, Alan L. Clock. 4,502,789, Cl. 368-27.000.

Heck, Ronald M.: *See*—
Rubbo, John T.; Burns, Kenneth R.; Heck, Ronald M.; and Early, John J., 4,502,444, Cl. 123-440.000.

Hedrick, Warren R.: *See*—
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Heeres, Jan; and Mostmans, Joseph, to Janssen Pharmaceutica, N.V. Derivatives of [4-(piperazin-1-yl-phenyloxymethyl)-1,3-dioxolan-2-ylmethyl]-1H-imidazoles and 1H-1,2,4-triazoles. 4,503,055, Cl. 514-285.000.

Hefti, Kurt; and Wirth, Stefan, to Franz Buttner AG. Ribbon cassette for word processors, printers and typewriters. 4,502,801, Cl. 400-208.000.

Hegedus, Elizabeth: *See*—
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Hegemann, Karl-Rudolf: *See—*
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Heine, Christian H., Jr.; McGaw, Robert W.; Wetzel, W. Edwin, Jr.; and Ziegler, Joseph, to Lone Star Steel Company. Inside-outside tube quenching apparatus. 4,502,669, Cl. 266-114.000.
Heinl, Werner, to Goetze AG. Compact integrated face seal unit. 4,502,697, Cl. 277-41.000.
Heinrich Frings GmbH & Co. Kg: *See—*
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Heizler, Fritz: *See—*
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Helbig, Helmut; and Verlemann, Manfred, to Windmoller & Holscher. Apparatus for drying printed or coated webs. 4,502,228, Cl. 34-47.000.
Helena Laboratories Corporation: *See—*
Golias, Tipton L.; and Mostyn, William T., Jr., 4,502,786, Cl. 356-435.000.
Heller, Jorge, to Bend Research, Inc. Water soluble polyesters. 4,502,976, Cl. 252-315.400.
Hemels, Martinus H.; and Schuren, Gerardus W., to Hoechst Aktiengesellschaft. Plate-shaped molded article and process for its preparation and use. 4,503,115, Cl. 428-281.000.
Hempel, George T. Air vent cover. 4,502,368, Cl. 98-29.000.
Hendry, Eric D., to English Electric Valve Company Limited. Camera tubes. 4,503,354, Cl. 313-382.000.
Henkel Kommanditgesellschaft: *See—*
Moller, Hinrich; and Wallat, Siegfried, 4,503,244, Cl. 514-544.000.
Hennechart, Jean-Paul; Bramaud, Bernard; and Prat, Francois, to Ziegler S.A. Installation for the continuous coating of a strip, especially for the galvanizing of sheet steel. 4,502,408, Cl. 118-61.000.
Henning, Paul N.: *See—*
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Hennings, Detlev; and Schreinemacher, Herbert, to U.S. Philips Corporation. Ceramic dielectric basis on bismuth-containing $BaTiO_3$. 4,503,482, Cl. 361-321.000.
Henrard, Jose ; Jacquemin, Marie-Noelle; and Leduc, Michel, to Thomson-Brandt. Control-lever for a game. 4,503,299, Cl. 200-61.520.
Henriksen, Henrik; Nielsen, Torben G.; and Taarning, Claus E., to F. L. Smidth & Company. Method and arrangement for protecting a thyristor switch of a pulse generator. 4,503,477, Cl. 361-2.000.
Hercules Incorporated: *See—*
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Herdle, William B., to Union Carbide Corporation. Preparation of polyalkylene polyamines. 4,503,250, Cl. 564-479.000.
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Iseli, Robert W.; and Herman, Herbert, 4,503,128, Cl. 428-446.000.
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Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, to Daimler-Benz Aktiengesellschaft. Adjustable servo-controlled outside rear view mirror. 4,502,759, Cl. 350-636.000.
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Heyman, Duane A., to BASF Wyandotte Corporation. Polymer dispersions and their uses. 4,503,193, Cl. 525-205.000.
Heyman, Duane A., to BASF Wyandotte Corporation. Process for the preparation of acrylamide graft polymer dispersions. 4,503,207, Cl. 326-307.500.
Hibben, Gilbert W. Folding throwing knife. 4,502,219, Cl. 30-153.000.
Hibino, Yozo; and Yamada, Sakae, to Hitachi, Ltd. Monitoring system for screw compressor. 4,502,833, Cl. 415-17.000.
Hicks, John E.: *See—*
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Hidaka, Kunihiko: *See—*
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Higaki, Hiromichi; and Miyazaki, Nobuyuki, to Asahi Glass Company Ltd. Paint-finishing composition for a cement base material. 4,503,097, Cl. 427-386.000.
Hignite, Alan L.; Wendt, Richard L.; Zeigler, Roy F.; and Zeigler, Warren L., to Tri City Laboratory Specialists, Inc. Fume hood sash operator. 4,502,375, Cl. 98-115.0LH.
Hillis, William J. Portable fire hose cleaning apparatus. 4,502,175, Cl. 15-104.920.
Hilpert, Fritz W.; Kohm, Erich; Rudolph, Volker; and Wohnsdorf, Manfred, to International Business Machines Corporation. Arrangement for pressing a print head against a record carrier. 4,502,797, Cl. 400-55.000.
Himes, James F., to UOP Inc. HF regeneration in aromatic hydrocarbon alkylation process. 4,503,277, Cl. 585-455.000.
Hinke, Walter, to Robert Bosch GmbH. Rotary angular position sensor with magnet and pole disk assembly mounted on rotatable shaft. 4,503,391, Cl. 324-208.000.
Hinks, William L., to Goodyear Tire & Rubber Company, The. Green tire-to-mold contact time detection, analysis, and control. 4,502,857, Cl. 425-29.000.
Hinlein, Sigmund; and Parikh, Shyam C., to Digital Equipment Corporation. Disk hub spindle system. 4,503,530, Cl. 369-270.000.
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Nishijima, Hideo; Fukushima, Isao; Teshima, Tsunehiko; Kobori, Yasunori; and Ito, Takayasu, 4,503,369, Cl. 318-254.000.
Ogata, Hisanao; Nemoto, Takeo; Hakuraku, Yoshinori; and Yagi, Yasuomi, 4,502,296, Cl. 62-514.00R.
Okada, Sadayuki; Sonobe, Hisao; and Mino, Tomoaki, 4,502,286, Cl. 62-119.000.
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Suzuki, Akio; Akiyama, Mitsuo; Kashiwazaki, Susumu; Suzuki, Shigeyasu; Tominaga, Yasunori; and Arakawa, Michihisa, 4,502,290, Cl. 62-229.000.
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Hemels, Martinus H.; and Schuren, Gerardus W., 4,503,115, Cl. 428-281.000.
Neu, Hermann; and Roscher, Gunter, 4,502,993, Cl. 260-415.000.
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Holcomb, Stephen A.; and Aker, Johnny E., to Holcomb, Stephen A. Pivot mounted cycle seat with spring cradle. 4,502,727, Cl. 297-209.000.
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Holzner, Peter; and Sedlmeier, Werner, to Siemens Aktiengesellschaft. Multi-microcomputer system with direct store access. 4,503,496, Cl. 364-200.000.
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Maurer, Fritz; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,503,057, Cl. 514-269.000.
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Brillhart, Bruce A., 4,503,344, Cl. 307-594.000.
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Mueller, Dale A., 4,502,625, Cl. 236-11.000.
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Hong, Charles A.: *See*—
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Hopkins, Gregory J., to Dexter Chemical Corporation. Foam applicator for wide fabrics. 4,502,304, Cl. 68-200.000.
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Horn, James M.: *See*—
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Hornung, Friedrich; Jundt, Wolfgang; Schadlich, Fritz; Vogt, Hans-Joachim; and Wunsch, Steffen, to Robert Bosch GmbH. Spring-coupled power screwdriver. 4,502,549, Cl. 173-12.000.
Horrigan, Richard. Breakaway safety halter. 4,502,265, Cl. 54-24.000.
Horton, Truman V. Method for preserving fishing bait. 4,503,077, Cl. 426-1.000.
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Hoshikawa, Toru; and Osaki, Yoshihiko, to Mitsubishi Denki Kabushiki Kaisha; and Toyo Tanso Co., Ltd. Inductive heating device having a plurality of heating coil units. 4,503,304, Cl. 219-10.49R.
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Houchens, Albert F.; Decina, Basil A., Jr.; Havens, James R.; Cleveland, Dixon; and Nagel, Gregory L., to General Motors Corporation. Method and apparatus for detecting the onset of melting in a resistance spot weld. 4,503,311, Cl. 219-109.000.
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Hsu, Chih-Min. Composite locking device. 4,503,422, Cl. 340-543.000.
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Hubeau, Jean-Pierre, to Finamex Finance Corporation. Apparatus for determining the blood group of an individual. 4,503,011, Cl. 422-73.000.
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Huber, Richard. Cock having a spherical plug. 4,502,663, Cl. 251-174.000.
Hucke, Edward E., to Union Oil Company of California. Furfural or furfural alchol impregnants for carbonacious bodies. 4,503,215, Cl. 528-232.000.
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Jaeger, Charles W.; Titterington, Donald R.; and Hue, Le P., 4,503,111, Cl. 428-195.000.
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Huenniger, Edward A., to Carrier Corporation. Waterbox for a shell and tube heat exchanger. 4,502,530, Cl. 165-72.000.
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Hultquist, John V. Dent pulling tool. 4,502,317, Cl. 72-479.000.
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Humphrey, Stanley A. Archery arrow having plastic vanes. 4,502,692, Cl. 273-423.000.
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Hunt, Joseph M., to Allegheny Ludlum Steel Corporation. Method for producing semiconductor devices. 4,503,089, Cl. 427-86.000.
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Husted, Martin D.; and Schuster, Norman J., to International Electronic Research Corp. Low friction insertion force retainer. 4,502,601, Cl. 211-41.000.
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Langejan, Hendrik, 4,502,405, Cl. 114-26.000.
Iiams, Donald E., Jr. Symmetrical folded alley game board. 4,502,686, Cl. 273-126.00R.
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Brittain, David R.; and Wood, Robin, 4,503,066, Cl. 514-409.000.
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Hatahira, Seiichi, 4,503,157, Cl. 501-1.000.
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Meek, Larry N., 4,502,212, Cl. 29-721.000.
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Robinson, Ivan M., 4,503,206, Cl. 526-255.000.
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Inoue, Jiro, to Murata Manufacturing Co., Ltd. Grooved piezoelectric ceramic resonator with two poling directions. 4,503,352, Cl. 310-359.000.
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Krygowski, Matthew A.; Messina, Benedicto U.; and Silkman, William D., 4,503,497, Cl. 364-200.000.
Lechaton, John S.; Malaviya, Shashi D.; Schepis, Dominic J.; and Srinivasan, Gurumakonda R., 4,502,913, Cl. 156-643.000.
McAnney, William H., 4,503,537, Cl. 371-25.000.
Schick, Jerome D.; and Wilson, Howard R., 4,503,521, Cl. 365-182.000.
Trumpp, Hans-Joachim; and Greschner, Johann, 4,502,914, Cl. 156-643.000.
Urquhart, Robert J., 4,503,514, Cl. 364-900.000.
International Electronic Research Corp.: *See*—
Husted, Martin D.; and Schuster, Norman J., 4,502,601, Cl. 211-41.000.
International Flavors & Fragrances Inc.: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,503,259, Cl. 568-382.000.
Hall, John B.; and Sprecker, Mark A., 4,503,258, Cl. 568-376.000.
Sprecker, Mark A., 4,502,494, Cl. 131-276.000.
International Harvester Company: *See*—
Gebben, Vernon D., 4,502,340, Cl. 73-862.330.
International Jensen Incorporated: *See*—
Johnson, William K.; and Ferrero, Jaime, 4,503,292, Cl. 179-178.000.

International Minerals & Chemical Corp.: *See*—
Majumdar, Kalyan K., 4,503,022, Cl. 423-321.00R.
International Standard Electric Corporation: *See*—
Hochreutiner, Roger M., 4,503,410, Cl. 335-153.000.
Internationale Octrooi Maatschappij "Octropa" BV: *See*—
Van Boom, Jacobus H.; Van Den Marel, Gijsbert A.; and Van Boeckel, Constant A. A., 4,503,233, Cl. 548-114.000.
Interpace Corporation: *See*—
Baileys, James P.; and Hedrick, Warren R., 4,502,370, Cl. 98-60.000.
Iowa State University Research Foundation, Inc.: *See*—
Runyan, William S., 4,502,418, Cl. 119-97.00R.
Smith, David L. O.; and Lohnes, Robert A., 4,502,338, Cl. 73-819.000.
Irimajiri, Shoichiro; and Fukui, Takeo, to Honda Giken Kogyo Kabushiki Kaisha. Internal combustion engine. 4,502,434, Cl. 123-193.00P.
Irvin Industries, Inc.: *See*—
White, James E.; Lobanoff, Mark; and Harris, Robert A., 4,502,674, Cl. 296-37.160.
Iseki, Masahide: *See*—
Kajita, Hiroshi; Nakajima, Tadanobu; and Iseki, Masahide, 4,502,779, Cl. 355-15.000.
Iseli, Robert W.; and Herman, Herbert. Thermally sprayable ceramics. 4,503,093, Cl. 427-248.100.
Iseli, Robert W.; and Herman, Herbert. Thermally sprayable ceramics. 4,503,128, Cl. 428-446.000.
Ishiguro, Yasuo: *See*—
Nakamori, Masao; and Ishiguro, Yasuo, 4,502,769, Cl. 354-152.000.
Ishii, Koji, to Ryobi Limited. Plate holding devices for offset duplicator. 4,502,388, Cl. 101-415.100.
Ishizuka, Yutaka: *See*—
Shibuya, Tsunenori; Ishizuka, Yutaka; and Nakamura, Teruo, 4,502,854, Cl. 418-15.000.
Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft: *See*—
Szabolcs, Otto, 4,503,266, Cl. 568-719.000.
Israel, Mrs. Lawrence: *See*—
Close, Leo R., 4,502,717, Cl. 292-316.000.
Itami, Teruhiko: *See*—
Saitoh, Koichi; Itami, Teruhiko; and Kimoto, Toshifumi, 4,503,438, Cl. 346-74.400.
Itek Corporation: *See*—
Hutchin, Richard A.; and Bradley, William C., 4,503,336, Cl. 250-578.000.
Ito, Seitoku: *See*—
Inagaki, Mitsuo; Ito, Seitoku; and Aoki, Hisashi, 4,502,850, Cl. 417-440.000.
Ito, Susumu: *See*—
Inaba, Hajimu; Nakashima, Seiichiro; Inagaki, Shigemi; and Ito, Susumu, 4,502,830, Cl. 414-735.000.
Ito, Takayasu: *See*—
Nishijima, Hideo; Fukushima, Isao; Teshima, Tsunehiko; Kobori, Yasunori; and Ito, Takayasu, 4,503,369, Cl. 318-254.000.
Ito, Tsuneo: *See*—
Yokoi, Shinichi; and Ito, Tsuneo, 4,502,430, Cl. 123-145.00A.
Ito, Yoji: *See*—
Nojiri, Tadao; Kanamaru, Kenji; Matsuyama, Masahiro; Nishikawa, Takayoshi; and Ito, Yoji, 4,503,528, Cl. 367-198.000.
Ito, Yuji, to Canon Kabushiki Kaisha. Eye inspection apparatus with variable field angle. 4,502,766, Cl. 351-206.000.
Itoh, Kiyoo: *See*—
Etoh, Jun; Kawajiri, Yoshiki; Hori, Ryoichi; and Itoh, Kiyoo, 4,503,522, Cl. 365-203.000.
Itoi, Toru. Outerwear and bag in one. 4,502,154, Cl. 2-108.000.
Itoi, Toru. Outerwear and bag in one. 4,502,155, Cl. 2-115.000.
ITT Industries, Inc.: *See*—
Adam, Fritz G., 4,503,342, Cl. 307-475.000.
Patzold, Dieter; Schreiber, Alfons; and Tiwi, Peter, 4,502,173, Cl. 15-41.00R.
Ivester, Frank D.; and Troulias, James R., to Combustion Engineering, Inc. Discharge electrode wire assembly for electrostatic precipitator. 4,502,872, Cl. 55-147.000.
Iwabuchi, Masaburo, to Tokyo Shibaura Denki Kabushiki Kaisha. Lapping machine. 4,502,252, Cl. 51-118.000.
Iwahashi, Hiroshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Semiconductor IC memory. 4,503,518, Cl. 365-104.000.
Iwai, Takashi: *See*—
Kamioka, Hajime; Takagi, Mikio; Sato, Noriaki; Nakano, Motoo; and Iwai, Takashi, 4,503,315, Cl. 219-121.0LE.
Iwanami, Yoshiyuki; Taniguchi, Kozo; Funazaki, Mitsunori; and Takenouchi, Tomoo, to Japan Steel Works, Ltd., The. Process and apparatus for the production of a metallic laminar composite material. 4,502,524, Cl. 164-66.100.
Iwano, Yoshimi: *See*—
Suzuki, Hajime; and Iwano, Yoshimi, 4,502,512, Cl. 139-116.000.
Iwata, Kazuroh: *See*—
Fukushima, Naoto; Iwata, Kazuroh; and Hidaka, Kunihiko, 4,502,575, Cl. 188-282.000.
Iwata, Masayosi; Hayashi, Yoshikazu; and Yokoyama, Tadashi, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Self-cancelling mechanism for cancelling a turn-signal switch of a vehicle. 4,503,296, Cl. 200-61.270.
IWK Verpackungstechnik GmbH: *See*—
Reim, Werner; and Garthe, Horst, 4,502,262, Cl. 53-157.000.
Iyama, Hiroyuki: *See*—
Watanabe, Yoshio; and Iyama, Hiroyuki, 4,503,359, Cl. 315-105.000.
J. M. Voith, GmbH: *See*—
Fissmann, Hans-Joachim; Meinecke, Albrecht; and Kemmer, Manfred, 4,502,231, Cl. 34-114.000.
Jable, Roger D.; and Settle, Alva R., to Boler Investments, Inc. Tandem axle suspension system. 4,502,707, Cl. 280-682.000.
Jackson, James R.: *See*—
Becker, Kenneth W.; Jackson, James R.; Lindblom, Gordon P.; and Walsh, Marjorie A., 4,502,962, Cl. 210-749.000.
Jackson, Joseph F., to Pratt Burnerd International Limited. Workholding devices. 4,502,704, Cl. 279-111.000.
Jackson, Samuel G. Apparatus and method of throttling centrifugal pump liquid output. 4,502,834, Cl. 415-26.000.
Jackson, William R.: *See*—
Swallow, Roger T.; Jackson, William R.; and Pierce, Jack D., 4,502,301, Cl. 66-178.00A.
Jackson, Winston J., Jr.: *See*—
Fagerburg, David R.; and Jackson, Winston J., Jr., 4,503,216, Cl. 528-355.000.
Jacobs, Arthur F.: *See*—
Norris, George W.; Kobuck, Richard M.; Varley, William J.; Jacobs, Arthur F.; and Ferree, Herbert E., 4,502,347, Cl. 74-447.000.
Jacobson, Allan J.: *See*—
Beyerlein, Robert A.; Poeppelmeier, Kenneth R.; and Jacobson, Allan J., 4,503,166, Cl. 502-303.000.
Jacquemin, Marie-Noelle: *See*—
Henrard, Jose ; Jacquemin, Marie-Noelle; and Leduc, Michel, 4,503,299, Cl. 200-61.520.
Jaeger, Charles W.; Titterington, Donald R.; and Hue, Le P., to Tektronix, Inc. Hydrophobic substrate with coating receptive to inks. 4,503,111, Cl. 428-195.000.
Jahnke, Frederick C.; Crouch, William B.; and Gulko, George M., to Texaco Inc. Synthesis gas generation process with control of ratio of steam to dry gas. 4,502,869, Cl. 48-197.00R.
Jamieson, John W.; Lee, Sen L.; and Moon, Suhdok D., to 501 Qume Corporation. Daisywheel printer. 4,502,800, Cl. 400-144.200.
Jandy Industries: *See*—
Johnson, Bruce R., 4,503,563, Cl. 455-351.000.
Janocha, Siegfried: *See*—
Crass, Gunther; Janocha, Siegfried; Dietz, Wolfgang; and Bothe, Lothar, 4,502,263, Cl. 53-396.000.
Janome Sewing Machine Co. Ltd.: *See*—
Kato, Kenji, 4,502,402, Cl. 112-158.00E.
Janssen Pharmaceutica, N.V.: *See*—
Heeres, Jan; and Mostmans, Joseph, 4,503,055, Cl. 514-285.000.
Janusch, Alois, to Voest-Alpine Aktiengesellschaft. Process for continuously drying and upgrading of organic solid materials such as, for example, brown coals. 4,502,227, Cl. 34-12.000.
Janutta, Reinhard; and Redeker, Werner, to Hauni-Werke Korber & Co. KG. Apparatus for dressing grinding wheels. 4,502,456, Cl. 125-11.0CD.
Japan Bano'k Co., Ltd.: *See*—
Kato, Masami, 4,503,006, Cl. 264-148.000.
Japan Servo Co., Ltd.: *See*—
Sakamoto, Masafumi, 4,503,368, Cl. 310-49.00R.
Japan Steel Works, Ltd., The: *See*—
Iwanami, Yoshiyuki; Taniguchi, Kozo; Funazaki, Mitsunori; and Takenouchi, Tomoo, 4,502,524, Cl. 164-66.100.
Japhet, William D. Hydraulic cylinder reconditioner. 4,502,316, Cl. 72-392.000.
Jasper, Joseph C.: *See*—
Cordea, James N.; Jasper, Joseph C.; and Sheth, Harshad V., 4,502,886, Cl. 75-125.000.
Jaw, Jih-long. Mild-temperature thermomassage instrument. 4,502,469, Cl. 128-24.100.
Jaworski, William R., to Jope Manufacturing Co., Inc. Hydrotherapy jet for tubs, spas or pools. 4,502,168, Cl. 4-496.000.
Jean Lassale S.A.: *See*—
Goy, Pierre, 4,502,791, Cl. 368-289.000.
Jebron Limited: *See*—
Harrison, Stephen J.; and Brown, Peter E., 4,502,180, Cl. 16-52.000.
Jehle, Nikolaus; Thuer, Markus; and Losert, Ewald, to Ciba-Geigy Corporation. Process for purifying organic solutions. 4,502,957, Cl. 210-690.000.
Jenkins, Curlee. Dog drip unit. 4,502,417, Cl. 119-95.000.
Jenkins Metal Corporation: *See*—
Jenkins, Robert B., Jr., 4,502,185, Cl. 19-95.000.
Jenkins, Robert B., Jr., to Jenkins Metal Corporation. Screen for carding machines. 4,502,185, Cl. 19-95.000.
Jeschke, Willi, to Heidelberger Druckmaschinen AG. Device for zonewise metering of ink on an ink duct roller of an inking unit for printing presses. 4,502,387, Cl. 101-365.000.
Jidosha Denki Kogyo Kabushiki Kaisha: *See*—
Sasaki, Ichiro; Tsutsui, Yujiro; Inoue, Masaru; and Kase, Toru, 4,502,718, Cl. 292-336.300.
Jidosha Kiki Co., Ltd.: *See*—
Okada, Kunio; Takeshima, Sadao; and Tashiro, Shuichirow, 4,502,504, Cl. 137-544.000.
Johnson, Bruce K.; and Triggs, Charles W., to Polaroid Corporation. Method and apparatus for blocking direct ambient from striking self-developing film unit. 4,502,767, Cl. 354-86.000.
Johnson, Bruce R., to Jandy Industries. Electrical device in a buoyant, watertight housing. 4,503,563, Cl. 455-351.000.
Johnson, David B.: *See*—
Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., 4,503,534, Cl. 371-9.000.

Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., 4,503,535, Cl. 371-11.000.

Johnson & Johnson Dental Products Company: *See*—
Basile, Peter A.; and Blatherwick, William J., 4,502,611, Cl. 221-93.000.

Johnson, Marvin M.: *See*—
Nowack, Gerhard P.; Johnson, Marvin M.; and Tabler, Donald C., 4,503,249, Cl. 564-385.000.

Johnson Matthey Public Limited Company: *See*—
Booker, David F.; Grove, David E.; Cotterill, Phillip J.; and Tyson, Robert G., 4,503,255, Cl. 568-17.000.

Johnson, Neil M., to Traction Research, Inc. Vehicle with pneumatic suspension. 4,502,736, Cl. 305-9.000.

Johnson, Russell W.: *See*—
Frame, Robert R.; Johnson, Russell W.; and Staehle, Bruce E., 4,502,949, Cl. 208-207.000.

Johnson, Thomas A.: *See*—
Ford, Michael E.; and Johnson, Thomas A., 4,503,253, Cl. 564-479.000.

Johnson, William K.; and Ferrero, Jaime, to International Jensen Incorporated. Cammed latching system for loudspeaker and grille. 4,503,292, Cl. 179-178.000.

Jolley, Jack, Jr.: *See*—
Maddox, James P.; Jolley, Jack, Jr.; Drobnick, Louis W.; and Amend, William E., 4,502,839, Cl. 415-202.000.

Jomo Jigs AB: *See*—
Josza, Janos, 4,502,907, Cl. 156-349.000.

Jones, Dennis J.; Scheidenhelm, Earl L.; and Truckenbrod, Thomas G., to Hart-Carter Company. Infinite adjustment means for sieve and chaffer slats. 4,502,493, Cl. 130-24.000.

Jones, John P., Jr.: *See*—
Behnke, Albert R., Jr.; Jones, John P., Jr.; Michielsen, Charles E., deceased; and Michielsen, Sophie, legal representative, 4,502,876, Cl. 55-387.000.

Jones, Richard A.; and Reoch, William D., to General Motors Corporation. Charging system for nickel-zinc batteries. 4,503,378, Cl. 320-20.000.

Jones, Richard H. Expansible tool for reaming frustoconical undercuts in cylindrical holes. 4,502,554, Cl. 175-285.000.

Jones, Thomas B., to Xerox Corporation. Apparatus for metering marking particles onto a developer roller. 4,502,412, Cl. 118-658.000.

Jones, Wendy: *See*—
Gerber, Bego; Block, Elliott; Bahar, Izak; Cantarow, Walter D.; Coseo, Mary; Eaton, Cheryl; Jones, Wendy; Kovac, Patricia; and Bruins, John, 4,503,143, Cl. 435-7.000.

Jope Manufacturing Co., Inc.: *See*—
Jaworski, William R., 4,502,168, Cl. 4-496.000.

Jordan, Hans-Peter: *See*—
Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.

Jordan, Peter A.; and Underhill, Michael J., to U.S. Philips Corporation. Frequency modulation using a phase modulator. 4,503,405, Cl. 332-18.000.

Jorgensen, Robert J.: *See*—
Golembeski, Nancy M.; Jorgensen, Robert J.; Cleland, Robert D.; and Noshay, Allen, 4,503,203, Cl. 526-159.000.

Josephson, Paul J.: *See*—
Ballard, Philip D.; Goin, Cheryl A.; Josephson, Paul J.; Keller, Andrew D.; Lykins, Larry W.; and Miller, Jeffrey J., 4,502,514, Cl. 141-1.000.

Joshi, Rajendra: *See*—
Lee, Sunggyu; and Joshi, Rajendra, 4,502,942, Cl. 208-11.00R.

Josza, Janos, to Jomo Jigs AB. Device for the manufacture of natural looking model railway tracks. 4,502,907, Cl. 156-349.000.

Joyce, Peter: *See*—
Mackie, David M.; and Joyce, Peter, 4,502,918, Cl. 162-24.000.

Jucha, Rhett B.: *See*—
Carter, Duane E.; and Jucha, Rhett B., 4,502,915, Cl. 156-643.000.

Jujo Paper Co., Ltd.: *See*—
Kato, Eiichi; Okamoto, Masataka; Ueda, Hiroshi; and Inaba, Masaharu, 4,502,984, Cl. 252-518.000.

Jullien, Claude: *See*—
Lerude, Gerard; and Jullien, Claude, 4,503,409, Cl. 335-132.000.

Jundt, Wolfgang: *See*—
Hornung, Friedrich; Jundt, Wolfgang; Schadlich, Fritz; Vogt, Hans-Joachim; and Wunsch, Steffen, 4,502,549, Cl. 173-12.000.

Jung, Charles G.: *See*—
Jung, Charles H.; and Jung, Charles G., 4,502,905, Cl. 156-184.000.

Jung, Charles H.; and Jung, Charles G., to Boeing Company, The. Tying machine and method. 4,502,905, Cl. 156-184.000.

Jung, Rudolf H.: *See*—
Reffert, Rudi W.; Hambrecht, Juergen; Jung, Rudolf H.; and Echte, Adolf, 4,503,219, Cl. 528-481.000.

Jungclaus, Gunther; and Krohn, Ernst-Otto, to Messerschmitt-Bolkow-Blohm GmbH. Device for preventing buzz in supersonic intakes of air-breathing reaction engines, particularly, ram jet engines. 4,502,651, Cl. 244-53.00B.

K-Line Industries, Inc.: *See*—
Kammeraad, James A., 4,502,696, Cl. 277-12.000.

Kabasin, Daniel F.; and Stoltman, Donald, to General Motors Corporation. Dual fuel supply system. 4,502,453, Cl. 123-575.000.

Kabushiki Kaisha Daikin Seisakusho: *See*—
Nakamichi, Noboru, 4,502,577, Cl. 192-4.00A.

Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho: *See*—
Kanesaka, Hiroshi, 4,502,282, Cl. 60-602.000.

Kabushiki Kaisha Kibun: *See*—
Ikoma, Mitsugi; Shinada, Takeo; and Nozaki, Hisashi, 4,503,081, Cl. 426-268.000.

Kabushiki Kaisha Kito: *See*—
Nakamura, Takayoshi, 4,502,667, Cl. 254-350.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Moritoki, Masato; Fujikawa, Takao; Kitagawa, Kazuo; and Miyanaga, Junichi, 4,503,319, Cl. 219-390.000.
Murase, Kazuo; Watanabe, Toshihiko; Takeuchi, Naoki; and Maruyama, Tokuji, 4,503,316, Cl. 219-130.320.
Okuda, Naoki; Usui, Akihiko; Yamamoto, Shigeaki; and Natsume, Shogo, 4,503,129, Cl. 428-562.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Kuromoto, Kazunori, 4,502,723, Cl. 294-88.000.
Miyake, Kimio; and Sugimoto, Kiyoshi, 4,502,235, Cl. 37-127.000.

Kabushiki Kaisha Morita Seisakusho: *See*—
Miyahara, Masato; Okano, Michiaki; and Beach, Daryl R., 4,503,552, Cl. 378-196.000.

Kabushiki Kaisha Suwa Seikosha: *See*—
Yokoyama, Hiroyuki, 4,502,790, Cl. 368-200.000.

Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See*—
Iwata, Masayosi; Hayashi, Yoshikazu; and Yokoyama, Tadashi, 4,503,296, Cl. 200-61.270.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Miyamoto, Noriaki; and Inoue, Norio, 4,502,273, Cl. 57-414.000.

KK Yamamoto Suiatsu Kogyosho: *See*—
Watase, Tosio; Mori, Koichi; Sasaki, Kazuo; Onizuka, Katsumi; Yoshikawa, Yuzo; and Fujita, Takeshi, 4,502,323, Cl. 73-49.600.

Kabushikikaisha Tyoda Jidoshokki Seisakusho: *See*—
Yoshimura, Tatsushiro; Terada, Tsutomu; and Nakayama, Shozo, 4,503,179, Cl. 524-262.000.

KACO GmbH + Co.: *See*—
Uhrner, Klaus-Jurgen, 4,502,694, Cl. 277-9.000.

Kaczynski, Bernhard, to Robert Bosch GmbH. Fuel injection nozzle for internal combustion engines. 4,502,326, Cl. 73-119.00A.

Kaiser, Josef, to Konig & Neurath Kommanditgesellschaft. Worktable, particularly an office desk. 4,502,393, Cl. 108-1.000.

Kajimura, Takashi: *See*—
Nakashima, Hisao; Umeda, Jun-ichi; Kuroda, Takao; Kajimura, Takashi; and Matsuda, Hiroshi, 4,503,540, Cl. 372-47.000.

Kajita, Hiroshi; Nakajima, Tadanobu; and Iseki, Masahide, to Mita Industrial Company Limited. Cleaning device for electrostatic copying machines. 4,502,779, Cl. 355-15.000.

Kakei, Tsutomu: *See*—
Mori, Teruo; Shirai, Hiroshi; Kakei, Tsutomu; Matsuhisa, Tsuneyasu; and Watanabe, Masaru, 4,502,933, Cl. 204-206.000.

Kakimi, Tsuneo; Nakanose, Megumi; Satoh, Hiroshi; Konishi, Takaharu; Kita, Hisanao; and Nakazaki, Takamitsu, to Nissan Motor Company, Limited; and Hitachi, Ltd. Method of welding titanium alloy parts with titanium insert. 4,503,314, Cl. 219-121.0ED.

Kakuda, Yosiro, to Toyota Jidosha Kabushiki Kaisha. Shock-cushioned lamp mounting structure for use in a vehicle. 4,503,487, Cl. 362-80.000.

Kalyanaraman, Palaiyur S.: *See*—
Gaudiana, Russell A.; and Kalyanaraman, Palaiyur S., 4,503,248, Cl. 564-307.000.

Kamata, Susumu; Matsui, Takeaki; and Haga, Nobuhiro, to Shionogi & Co., Ltd. Aldosterone-antagonistic steroids. 4,502,989, Cl. 260-239.570.

Kamei, Taketo; and Osada, Kimio, to Tokyo Shibaura Denki Kabushiki Kaisha. Fluorescent lamp having separate cooling means for ballast and fluorescent tube. 4,503,358, Cl. 315-58.000.

Kamioka, Hajime; Takagi, Mikio; Sato, Noriaki; Nakano, Motoo; and Iwai, Takashi, to Fujitsu Limited. Semiconductor device with fuse. 4,503,315, Cl. 219-121.0LE.

Kammeraad, James A., to K-Line Industries, Inc. Valve seal retainer with multiple diameter boot base. 4,502,696, Cl. 277-12.000.

Kamohara, Eiji, to Tokyo Shibaura Denki Kabushiki Kaisha. Mask-focusing color picture tube. 4,503,355, Cl. 313-402.000.

Kampe, Wolfgang: *See*—
Wiedemann, Fritz; Kampe, Wolfgang; Thiel, Max; Sponer, Gisbert; Roesch, Egon; and Dietmann, Karl, 4,503,067, Cl. 514-411.000.

Kanai, Isao: *See*—
Yokozawa, Masami; and Kanai, Isao, 4,503,452, Cl. 357-72.000.

Kanamaru, Kenji: *See*—
Nojiri, Tadao; Kanamaru, Kenji; Matsuyama, Masahiro; Nishikawa, Takayoshi; and Ito, Yoji, 4,503,528, Cl. 367-198.000.

Kandybowski, Steven J.: *See*—
Bright, Edward J.; Kandybowski, Steven J.; Sheesley, Wilmer L.; and Sinisi, David B., 4,502,747, Cl. 339-75.00M.

Kanegae, Hidetoshi; Oshiage, Katsunori; Yamamoto, Akito; and Hosaka, Akio, to Nissan Motor Company, Limited. Fail-safe system for automotive engine control system for fail-safe operation as crank angle sensor fails operation thereof and fail-safe method therefor, and detection of fault in crank angle sensor. 4,502,446, Cl. 123-479.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Kato, Yasushi; Furukawa, Hisao; and Nakatsuka, Saori, 4,503,181, Cl. 524-391.000.

Kanesaka, Hiroshi, to Usui Kokusai Sangyo Kabushiki Kaisha; and Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho. Turbo-charged compression ignition engine operable at small compression ratio. 4,502,282, Cl. 60-602.000.

Kanto Denka Kogyo Co., Ltd.: *See*—
Hara, Kenkichi; Yokoe, Shigeo; Oka, Kazuyoshi; Murakami, Tamotsu; and Hashimoto, Tsugifusa, 4,503,136, Cl. 430-106.600.

Kaporovich, Vladimir G.: *See*—
Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.

Kaporovich, Vladimir V.: *See*—
Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.

Kapucinski, Vernon. Dip net and minnow bucket aerator. 4,502,240, Cl. 43-11.000.

Karaki, Kouichi, to Olympus Optical Co., Ltd. Color hardcopy apparatus. 4,503,458, Cl. 358-75.000.

Karcher, Alfred. Progressive liquid distributor. 4,502,567, Cl. 184-7.400.

Karl Lautenschlager KG, Mobelbeschlagfabrik: *See*—
Lautenschlager, Karl; and Lautenschlager, Gerhard, 4,502,182, Cl. 16-288.000.

Karl Schaeff GmbH & Co.: *See*—
Schaeff, Hans, 4,502,709, Cl. 280-758.000.

Karpenko, Anatole N., to Anchor/Darling Valve Company. Vacuum breaker valve with internally balanced disc. 4,502,503, Cl. 137-527.800.

Karubian, Ralph, to Kentmaster Manufacturing Co., Inc. Reversible carcass saw. 4,502,184, Cl. 17-23.000.

Kase, Toru: *See*—
Sasaki, Ichiro; Tsutsui, Yujiro; Inoue, Masaru; and Kase, Toru, 4,502,718, Cl. 292-336.300.

Kashiwayama, Shinei. Dermatic medicament. 4,503,041, Cl. 424-115.000.

Kashiwazaki, Susumu: *See*—
Suzuki, Akio; Akiyama, Mitsuo; Kashiwazaki, Susumu; Suzuki, Shigeyasu; Tominaga, Yasunori; and Arakawa, Michihisa, 4,502,290, Cl. 62-229.000.

Katayama, Hiroomi; Hirosawa, Yoshiaki; and Fujii, Masahiko, to New Nippon Electric Co., Ltd.; and Honda Giken Kogyo Kabushiki Kaisha. Input/output unit modifiable engine ignition control apparatus. 4,502,441, Cl. 123-416.000.

Kathiriya, Shiraz A.: *See*—
Garwood, Donald C.; and Kathiriya, Shiraz A., 4,502,479, Cl. 128-90.000.

Kato, Eiichi; Okamoto, Masataka; Ueda, Hiroshi; and Inaba, Masaharu, to Jujo Paper Co., Ltd. Electroconductive base sheet for electrostatic recording. 4,502,984, Cl. 252-518.000.

Kato, Hiroshi, to Fuji Xerox Co., Ltd. Picture image enlarging/reducing system. 4,503,469, Cl. 358-287.000.

Kato, Hiroshi, to Pioneer Electronic Corporation. Optical disc. 4,503,531, Cl. 369-275.000.

Kato, Hisanori; and Takagi, Tomio, to Sumitomo Heavy Industries, Ltd. Transfer mechanism. 4,502,591, Cl. 198-621.000.

Kato, Kenji, to Janome Sewing Machine Co. Ltd. Sewing machine with pattern editing function. 4,502,402, Cl. 112-158.00E.

Kato, Masami, to Toska Co., Ltd.; Ben Clements & Sons, Inc.; and Japan Bano'k Co., Ltd. Method and apparatus for manufacturing tag pin assemblies. 4,503,006, Cl. 264-148.000.

Kato, Yasushi; Furukawa, Hisao; and Nakatsuka, Saori, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Curable composition. 4,503,181, Cl. 524-391.000.

Katoh, Hisashi; Shinagawa, Hiroshi; and Miura, Keiji, to Honda Giken Kogyo Kabushiki Kaisha. Blow-by gas recovering system for internal combustion engines. 4,502,424, Cl. 123-41.860.

Katsuma, Makoto; Hiramatsu, Akira; and Murakami, Hiroyasu, to Canon Kabushiki Kaisha. Camera with a voice transmitting device. 4,502,771, Cl. 354-289.100.

Katsuyama, Harumi; Amano, Yoshikazu; and Kondo, Asaji, to Fuji Photo Film Co., Ltd. Quantitative analysis film. 4,503,145, Cl. 435-16.000.

Katzschner, Wolfgang, to Siemens Aktiengesellschaft. Ink jet color-coding method for leads. 4,503,437, Cl. 346-1.100.

Kawa, Masao, to Nippon Electric Co., Ltd. Optical fiber interconnection mechanism. 4,502,754, Cl. 350-96.200.

Kawaguchi, Yoshio: *See*—
Nakata, Shuji; Kawaguchi, Yoshio; and Aono, Susumu, 4,503,312, Cl. 219-117.100.

Kawai Musical Instruments Mfg. Co., Ltd.: *See*—
Deutsch, Ralph, 4,502,360, Cl. 84-1.230.

Kawai, Yoichiro: *See*—
Fujii, Setsuro; Yasui, Bompei; Miyamoto, Tomohisa; Shiga, Masatoshi; Ando, Kazuko; Hashimoto, Iwao; Kawasaki, Masahiro; Kawai, Yoichiro; and Mino, Yuji, 4,503,045, Cl. 514-25.000.

Kawajiri, Yoshiki: *See*—
Etoh, Jun; Kawajiri, Yoshiki; Hori, Ryoichi; and Itoh, Kiyoo, 4,503,522, Cl. 365-203.000.

Kawakami, Kanji; Narishige, Shinji; and Suenaga, Masahide, to Hitachi, Ltd. Magnetoresistive sensor having a closed domain structure and electrode biasing. 4,503,394, Cl. 324-252.000.

Kawamura, Hideaki: *See*—
Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Ohtsuki, Toshiaki, 4,503,373, Cl. 318-570.000.

Kawasaki, Masahiro: *See*—
Fujii, Setsuro; Yasui, Bompei; Miyamoto, Tomohisa; Shiga, Masatoshi; Ando, Kazuko; Hashimoto, Iwao; Kawasaki, Masahiro; Kawai, Yoichiro; and Mino, Yuji, 4,503,045, Cl. 514-25.000.

Kawasaki Steel Corporation: *See*—
Morita, Masahiko; Mano, Junichi; Nishida, Minoru; Tanaka, Tomoo; Aoyagi, Nobuo; and Takizawa, Syoichi, 4,502,897, Cl. 148-12.00F.

Kawase, Kaoru: *See*—
Yumoto, Takaari; Hayakawa, Kiyoshi; Kawase, Kaoru; Yamakita, Hiromi; and Taoda, Hiroshi, 4,502,930, Cl. 204-160.100.

Kawashima, Kazuharu: *See*—
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Kawashima, Yuji: *See*—
Kobayashi, Toshiaki; Kawashima, Yuji; Yoshimura, Masafumi; Sugiura, Masaru; Nobe, Tomio; and Fujimoto, Sumio, 4,502,975, Cl. 252-315.100.

Kawata, Yoshimasa: *See*—
Minami, Kenji; Kawata, Yoshimasa; Ushio, Tetsuji; Tani, Hoshiro; and Mitani, Kazuhisa, 4,502,924, Cl. 204-16.000.

Kawczak, Alex W.: *See*—
Gunesin, Binnur Z.; and Kawczak, Alex W., 4,503,187, Cl. 525-71.000.

Kayaba, Hitoshi: *See*—
Fujiya, Sigeru; Tsubaki, Tohru; Amano, Naoki; Yaginuma, Kyuzi; Kayaba, Hitoshi; Aiko, Yoriyuki; and Takahashi, Takeshi, 4,503,481, Cl. 361-341.000.

Kayama, Tsutomu, to Mitsubishi Denki Kabushiki Kaisha. Cold water supply system. 4,502,289, Cl. 62-185.000.

Kaydee Engineering, Inc.: *See*—
Rosenberger, Leonard S., 4,502,392, Cl. 105-451.000.

Kazama, Satoshi: *See*—
Kobayashi, Nobushige; and Kazama, Satoshi, 4,502,515, Cl. 141-195.000.

Kazaoka, Kenichi; and Okazaki, Hiroshi, to Aisin Seiki Kabushiki Kaisha. Fixed-angle adjusting mechanism. 4,502,730, Cl. 297-366.000.

Keane, John J.; and Pauze, Denis R., to General Electric Company. Corona-resistant wire enamel compositions and conductors insulated therewith. 4,503,124, Cl. 428-372.000.

Keating of Chicago, Inc.: *See*—
Keating, Richard T., 4,502,461, Cl. 126-39.00K.

Keating, Richard T. Cleaning system for deep fryer. 4,502,373, Cl. 99-337.000.

Keating, Richard T., to Keating of Chicago, Inc. Griddle control for minimum temperature variation. 4,502,461, Cl. 126-39.00K.

Kebedjis, Georges, to S.N.E.C.M.A. Fan blade axial locking device. 4,502,841, Cl. 416-220.00R.

Keel, Frederick; Townsend, Keith G.; and Carter, Marshall C. Yarn feeder mechanisms and double cylinder knitting machines having such mechanisms. 4,502,299, Cl. 66-14.000.

Kelleghan, William J., to Hughes Aircraft Company. Process for making bis(halophenyl)hexafluoropropanes. 4,503,254, Cl. 568-14.000.

Keller, Andrew D.: *See*—
Ballard, Philip D.; Goin, Cheryl A.; Josephson, Paul J.; Keller, Andrew D.; Lykins, Larry W.; and Miller, Jeffrey J., 4,502,514, Cl. 141-1.000.

Kellerman, Anne S.: *See*—
Agnew, Palmer W.; Erhard, John J.; and Kellerman, Anne S., 4,503,516, Cl. 364-900.000.

Kelly, Gordon E.; Merrell, Richard G.; and Nakanishi, Mutsuo, to Zenith Electronics Corporation. Automatic homing system for a subscription television signal decoder. 4,503,462, Cl. 358-122.000.

Kelly, John W., to Haskel, Inc. Swaging apparatus having elastically deformable members with segmented supports. 4,502,308, Cl. 72-58.000.

Kelz, Reinhard, to Gypsy Pan Limited. Cottage grill. 4,502,460, Cl. 126-29.000.

Kemmer, Manfred: *See*—
Fissmann, Hans-Joachim; Meinecke, Albrecht; and Kemmer, Manfred, 4,502,231, Cl. 34-114.000.

Ken-Air, Inc.: *See*—
Krogh, Paul M., 4,502,237, Cl. 42-50.000.

Kentmaster Manufacturing Co., Inc.: *See*—
Karubian, Ralph, 4,502,184, Cl. 17-23.000.

Kerber, Helmut: *See*—
Cappel, Bert; Kerber, Helmut; Schuhmann, Siegfried; and Steiner, Gerd, 4,502,386, Cl. 101-350.000.

Kerner, Dieter: *See*—
Klebe, Hans; Koth, Detlev; Kerner, Dieter; Schmid, Josef; and Schmid, Manfred, 4,503,092, Cl. 427-213.000.

Kernforschungsanlage Julich GmbH: *See*—
Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, 4,502,642, Cl. 241-79.100.

Kerr-McGee Refining Corporation: *See*—
Nelson, Stephen R., 4,502,944, Cl. 208-45.000.

Kertok, Mark E., to Phillips Petroleum Company. Mixing apparatus. 4,502,858, Cl. 425-204.000.

Kessler, Bayard F., to Novation, Inc. Intelligent telephone. 4,503,288, Cl. 179-2.0DP.

Keysell, F. Kerry; and Lawrence, Robert G., to Quantock Veal Limited. Automatic animal feeder. 4,502,416, Cl. 119-51.110.

Khoobiar, Sargis, to Halcon SD Group, Inc., The. Process for producing methacrylic acid. 4,503,247, Cl. 562-535.000.

Kidd, Robert C.; and Porn, Lawrence J., to General Motors Corporation. Oil level detection circuit. 4,503,419, Cl. 340-59.000.

Kidde, Inc.: *See*—
Lambiris, Christos, 4,502,584, Cl. 194-1.00G.

Kihara, Taku: *See*—
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Kikkawa, Nobuyuki: *See*—
Takematsu, Tetsuo; Kikkawa, Nobuyuki; and Ogawa, Hideaki, 4,502,883, Cl. 71-118.000.
Kikkoman Corporation: *See*—
Nakajima, Motoo; Nakamura, Kazuo; Shirokane, Yoshio; and Mizusawa, Kiyoshi, 4,503,147, Cl. 435-25.000.
Kim, Wontaik, to General Electric Company. Graphite fiber tactile sensor. 4,503,416, Cl. 338-99.000.
Kimberly-Clark Corporation: *See*—
Clark, Gerald L.; and Ford, Terry P., 4,502,675, Cl. 270-40.000.
Kimoto, Toshifumi: *See*—
Saitoh, Koichi; Itami, Teruhiko; and Kimoto, Toshifumi, 4,503,438, Cl. 346-74.400.
Kimpara, Hidenori: *See*—
Sugio, Akitoshi; Masu, Masanobu; Matunaga, Masatugu; and Kimpara, Hidenori, 4,503,186, Cl. 525-63.000.
Kimura, Shogo; and Takahashi, Haruo, to Sanden Corporation. Refrigerant compressor with mechanism for adjusting capacity of the compressor. 4,502,844, Cl. 417-275.000.
Kinard, Dean P.: *See*—
Coulson, Richard L.; Blickenstaff, Ronald L.; Dodd, P. David; Moreno, Robert J.; and Kinard, Dean P., 4,503,501, Cl. 364-300.000.
King, Donald W.; and Placzek, Terrance M., to A. Duda and Sons, Inc. Process for the manufacture of ethyl alcohol from citrus molasses. 4,503,079, Cl. 426-54.000.
King, Hewson N. G.; and Beasley, James P., to U.S. Philips Corporation. Method of using an electron beam. 4,503,334, Cl. 250-491.100.
Kinoshita, Kimiaki: *See*—
Yahagi, Masakichi; Kinoshita, Kimiaki; and Enokiya, Masashi, 4,503,446, Cl. 346-209.000.
Kippenberg, Horst; Haessler, Heinrich; and Huehnlein, Manfred, to Siemens Aktiengesellschaft. Process of producing a compound material of chromium and copper. 4,503,010, Cl. 419-27.000.
Kirk, Thomas E., to General Motors Corporation. Power supply system for low cold resistance loads. 4,503,365, Cl. 315-310.000.
Kiser, John L.; and Griffith, Vernon D. Physiologic device and method of treating the leg extremities. 4,502,470, Cl. 128-64.000.
Kishi, Hajimu: *See*—
Nozawa, Ryoichiro; Komiya, Hidetsugu; Kishi, Hajimu; Matsuura, Hitoshi; Yamazaki, Etsuo; and Sakurai, Hiroshi, 4,503,372, Cl. 318-560.000.
Kishi, Norimasa: *See*—
Suzuki, Tadashi; and Kishi, Norimasa, 4,502,354, Cl. 74-866.000.
Kishimoto, Yoshio; and Hayashi, Takeshi, to Matsushita Electric Industrial Co., Ltd. Heat sensitive heater wire. 4,503,322, Cl. 219-505.000.
Kiso, Mataichiro: *See*—
Fukunaga, Tokio; Futakawa, Akemi; and Kiso, Mataichiro, 4,502,329, Cl. 73-573.000.
Kistler Instrumente A.G.: *See*—
Sonderegger, Conrad; Sonderegger, Hans C.; and Boltshauser, Werner, 4,503,351, Cl. 310-329.000.
Kita, Hisanao: *See*—
Kakimi, Tsuneo; Nakanose, Megumi; Satoh, Hiroshi; Konishi, Takaharu; Kita, Hisanao; and Nakazaki, Takamitsu, 4,503,314, Cl. 219-121.0ED.
Kitabayashi, Yukio; Takahashi, Noriyoshi; Watanabe, Masatoshi; Okuyama, Toshiaki; and Tanaka, Yoji, to Hitachi, Ltd. Variable speed rotary electric machine. 4,503,377, Cl. 318-807.000.
Kitagawa, Hiroji, to Kitagawa Industries Co., Ltd. Bands for clamping. 4,502,187, Cl. 24-16.0PB.
Kitagawa Industries Co., Ltd.: *See*—
Kitagawa, Hiroji, 4,502,187, Cl. 24-16.0PB.
Kitagawa, Kazuo: *See*—
Moritoki, Masato; Fujikawa, Takao; Kitagawa, Kazuo; and Miyanaga, Junichi, 4,503,319, Cl. 219-390.000.
Kitamoto, Tatsuji: *See*—
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Kitasato Institute, The: *See*—
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Kitzman, H. Charles. Grain dryer. 4,502,229, Cl. 34-56.000.
Kiyama, Masatoshi: *See*—
Yamauchi, Koichi; Tsuji, Nobuo; Yamada, Yasuyuki; Funabashi, Shinichi; and Kiyama, Masatoshi, 4,503,120, Cl. 428-336.000.
Klaasa, Reinhard M.; and Suriano, Francis J., to Garrett Corporation, The. Foil bearing alignment. 4,502,795, Cl. 384-103.000.
Klebe, Hans; Koth, Detlev; Kerner, Dieter; Schmid, Josef; and Schmid, Manfred, to Degussa Aktiengesellschaft. Process for the hydrophobization of pyrogenically produced silica. 4,503,092, Cl. 427-213.000.
Klein, Wilhelm: *See*—
Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Batusch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.
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Klier, Michael: *See*—
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Kline, Gerald R.; and Lakin, Kenneth M., to United States of America, Energy. Acoustic resonator and method of making same. 4,502,932, Cl. 204-192.0EC.
Kling, Michael J.: *See*—
Marino, Joseph A.; Kling, Michael J.; and Roth, Sydney J., 4,502,324, Cl. 73-117.300.
Klinner, Wilfred E., to National Research Development Corporation. Crop engaging apparatus and methods. 4,502,267, Cl. 56-13.600.
Klomp, Edward D., to General Motors Corporation. Measurement of mass airflow into an engine. 4,502,325, Cl. 73-118.000.
Klomp, Edward D.; and Cornelius, Walter, to General Motors Corporation. Fuel injection nozzle with auto-rotating tip. 4,502,635, Cl. 239-251.000.
Klug, Alan G., to Ingersoll Equipment Co., Inc. Self-energizing friction drive transmission. 4,502,344, Cl. 74-194.000.
Knecht, George W., to Midland-Ross Corporation. Interlocking plug and receptacle mechanism with actuating means. 4,503,293, Cl. 200-50.00B.
Knecht, Heinz: *See*—
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Knifton, John F.: *See*—
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Knighton, David R.: *See*—
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Knobloch, Dale B., to Rockmont Industries, Inc. Hide tanning composition and method of preparing same. 4,502,859, Cl. 8-94.290.
Knoll, Peter; Konig, Winfred; and Ziegler, Wolfgang, to Robert Bosch GmbH. Gradient-free illumination of passive readout display devices. 4,502,761, Cl. 350-345.000.
Kobari, Yuji: *See*—
Yagi, Eiji; Hatori, Yukiyoshi; and Kobari, Yuji, 4,503,297, Cl. 200-61.390.
Kobayashi, Kazuo; Furuta, Mamoru; and Maeno, Yoshio, to NGK Insulators, Ltd. Ceramic arc tube for metal vapor discharge lamps. 4,503,356, Cl. 313-634.000.
Kobayashi, Nobushige; and Kazama, Satoshi, to Maruyama Industrial Co., Ltd. Dry battery driven liquid pump. 4,502,515, Cl. 141-195.000.
Kobayashi, Tetuo; and Ohgaki, Katuyoshi, to Nippon Cable System Inc. Guide rail for a window regulator and slide guide mechanism employing the same. 4,502,247, Cl. 49-352.000.
Kobayashi, Toshiaki; Kawashima, Yuji; Yoshimura, Masafumi; Sugiura, Masaru; Nobe, Tomio; and Fujimoto, Sumio, to New Japan Chemical Co., Ltd. Compositions for recovering an organic material from an oily layer on a body of water. 4,502,975, Cl. 252-315.100.
Kobayashi, Toshiaki; and Tanaka, Masato, to Agency of Industrial Science & Technology. Method for the preparation of α-ketoamide imines. 4,503,232, Cl. 546-336.000.
Kobayashi, Yoshiro: *See*—
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Kober, Kurt; Wohrle, Rudolf; and Kohler, Robert, to Alois Kober AG. Tractor-trailer combination with a coupling connection. 4,502,561, Cl. 280-446.00B.
Kobori, Yasunori: *See*—
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Koch, Werner: *See*—
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Kochevar, Rudolph J. Golf club head and method of weighting same. 4,502,687, Cl. 273-171.000.
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Goldbecker, Wilfried, 4,502,398, Cl. 112-121.120.
Koenig, Leonard R.: *See*—
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Koenig, Rainer; Sieglen, Rolf; Weisser, Wolfgang; and Heide, Helga, to Luossavaara-Kiirunavaara AB. Suction device for obtaining dust samples. 4,502,951, Cl. 209-21.000.
Kofahl, William M. Jet engine pump and downhole heater. 4,502,535, Cl. 166-105.000.
Koffski, James R. Work support. 4,502,565, Cl. 182-184.000.
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Kohler, Robert: *See*—
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Kohli, Jerry L., to Buxton, Inc. Theme belt buckle. 4,502,188, Cl. 24-163.00K.
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Koizumi Sangyo Co., Ltd.: *See*—
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Kojak, Alexander T.: *See*—
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Kojima, Tetsuhiko: *See*—
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Kokoszka, John J.: *See*—
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Kolodziejcuk, Henriette, executrix: *See*—
DeLuccia, Victor C., deceased; DeLuccia, Nancy, executrix; Grincell, Ann, executrix; and Kolodziejcuk, Henriette, executrix, 4,502,482, Cl. 128-207.150.
Komatsu, Hiroshi, to Fuji Jukogyo Kabushiki Kaisha. Clutch disk for a clutch and method of treating a facing of a clutch. 4,502,581, Cl. 192-70.140.
Komiya, Hidetsugu: *See*—
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Kommoss, Klaus; and Schutte, Valentin H., to U.S. Philips Corporation. Magnetic tape-cassette apparatus comprising at least two push-buttons. 4,503,476, Cl. 360-137.000.
Kondo, Asaji: *See*—
Katsuyama, Harumi; Amano, Yoshikazu; and Kondo, Asaji, 4,503,145, Cl. 435-16.000.
Kondo, Masahiro: *See*—
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Kondracki, Henry C.: *See*—
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Konicek, Jiri K., to Oak Industries Inc. Printed circuit material. 4,503,112, Cl. 428-216.000.
Konig & Neurath Kommanditgesellschaft: *See*—
Kaiser, Josef, 4,502,393, Cl. 108-1.000.
Konig, Winfred: *See*—
Knoll, Peter; Konig, Winfred; and Ziegler, Wolfgang, 4,502,761, Cl. 350-345.000.
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Konishi, Takaharu: *See*—
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Koolflo Limited: *See*—
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Kopil, Steven J.: *See*—
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Koppner, Manfred: *See*—
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Korbel, Gerald E.; and Newell, Richard G., to Minnesota Mining and Manufacturing Company. Latent Lewis acid catalyst encapsulated within polymerized cycloaliphatic epoxide and polyhydric alcohol. 4,503,161, Cl. 502-159.000.
Koshino, Yutaka: *See*—
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Koskinen, Ensio; and Yli-Vakkuri, Erkki, to Enso-Gutzeit Oy. Procedure for washing cellulose. 4,502,171, Cl. 8-156.000.
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Kotitschke, Ronald; and Stephan, Wolfgang, to Biotest-Serum-Institut GmbH. Coagulant plasma-protein solution. 4,503,039, Cl. 424-101.000.
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Lunn, William H. W., to Eli Lilly and Company. 7-(2-(Substituted cinnolinoyl)amino)acetamido)-1-oxa-beta-lactams. 4,503,052, Cl. 514-210.000.
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Lushtak, Alexander S.; and Forker, John S., to Matsushita Electric Industrial Co., Ltd. Computer with expanded addressing capability. 4,503,491, Cl. 364-200.000.
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Lynch, Cornelius E., Jr.: *See*—
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Lynch, Gary M. Misting control apparatus. 4,502,288, Cl. 62-171.000.
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Cappel, Bert; Kerber, Helmut; Schuhmann, Siegfried; and Steiner, Gerd, 4,502,386, Cl. 101-350.000.
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MacDermid, Incorporated: *See*—
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MacDonald, Robin B.: *See*—
Wilson, Michael E.; Olson, David R.; Stone, Walter H.; and MacDonald, Robin B., 4,502,956, Cl. 210-248.000.
Machler, David C. Corner fastener. 4,502,260, Cl. 52-656.000.
MacIntyre, Duncan, to National Research Development Corporation. Soil working device with cleaner. 4,502,547, Cl. 172-606.000.

Mackie, David M.; and Joyce, Peter, to MacMillan Bloedel Limited. Two-stage chemical treatment of mechanical wood pulp with sodium sulfite. 4,502,918, Cl. 162-24.000.
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Madden, James A.; and LeDuc, Kenneth C., to General Electric Company. Apparatus for the automatic closure of electrochemical cells. 4,502,213, Cl. 29-730.000.
Maddox, James P.; Jolley, Jack, Jr.; Drobnick, Louis W.; and Amend, William E., to Transamerica Delaval Inc. Vibration damping of rotor carrying liquid ring. 4,502,839, Cl. 415-202.000.
Maeda, Kenichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Pattern recognition apparatus and method. 4,503,557, Cl. 382-34.000.
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Maeno, Yoshio: *See*—
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Magar, Surendar S., to Texas Instruments Incorporated. Microcomputer with bus interchange module. 4,503,500, Cl. 364-200.000.
Maggi, Carlo A.: *See*—
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Mainiero, Joseph J.; Mainiero, Michael R.; and Stanley, Arthur T., to Man Barrier Corporation. Extensible and retractable barrier and electromagnetic intrusion detector therefor. 4,503,423, Cl. 340-552.000.
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Majumdar, Kalyan K., to International Minerals & Chemical Corp. Process for oxidation of wet process phosphoric acid. 4,503,022, Cl. 423-321.00R.
Makita, Fujio, to Fuji Jukogyo Kabushiki Kaisha. System for preventing the overheat of a clutch for an internal combustion engine. 4,502,579, Cl. 192-0.052.
Makita, Hiroyuki, to Koito Manufacturing Company Limited. Self-locking nut for adjustable headlamp assembly. 4,503,486, Cl. 362-61.000.
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Malhi, Satwinder, to Texas Instruments Incorporated. Method for fabricating overlaid device in stacked CMOS. 4,502,202, Cl. 29-571.000.
Malik, Ashgar K.; and Celio, John A., to NCR Corporation. Common circuit for dynamic memory refresh and system clock function. 4,503,525, Cl. 365-222.000.
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Malloy, Thomas P.: *See*—
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Mancillas, Monica M. Electric steam generating hair curling iron and method of use thereof. 4,503,317, Cl. 219-225.000.
Mancinelli, Paul A., to Atlantic Richfield Company. Acrylates as coupling agents for star-block copolymers. 4,503,188, Cl. 525-98.000.
Mano, Junichi: *See*—
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Maruss, Josef, to Georg Spiess GmbH. Sheet accelerating device. 4,502,678, Cl. 271-270.000.
Marchioro, Ignazio, to Escher Wyss Aktiengesellschaft. Apparatus for controlling the pressing force between a controlled deflector roll and a counter element. 4,502,312, Cl. 72-243.000.
Marino, Joseph A.; Kling, Michael J.; and Roth, Sydney J., to Bear Automotive Service Equipment Company. Engine analyzer power check apparatus. 4,502,324, Cl. 73-117.300.
Mariotti, Rene G., to Friteco, Inc. Deep-fryer pan for industrial fryers. 4,502,372, Cl. 99-330.000.
Marongiu, Jacques, to Rhone-Poulenc Specialities Chimiques. Aqueous dispersions of synthetic resins, their use as binders in adhesive compositions, and adhesive compositions obtained. 4,503,184, Cl. 524-519.000.
Marr, Rolf; Bart, Hans-Jorg; and Wachter, Reinhard, to Vereinigte Metallwerke Ranshofen-Berndorf AG. Method of removing arsenic from a copper electrolyte. 4,503,015, Cl. 423-24.000.
Marron, Antonio G., to Montoya, Raul C.; and Marron, Victor G. Universal multiple angle work piece holder with multiple tool conversion features. 4,502,457, Cl. 125-11.00A.
Marron, Victor G.: *See*—
Marron, Antonio G., 4,502,457, Cl. 125-11.00A.
Marsh, Robert E.; and Colburn, Michael H., to Plasworld, Inc. Water purifying apparatus with air check valve and filter condition indication. 4,502,953, Cl. 210-94.000.
Martin, Jack E., to Noodle Corporation. Valveless free plunger and system for well pumping. 4,502,843, Cl. 417-56.000.
Martin, John F.: *See*—
Elliott, Richard M.; Holland, Larry L.; Gilbride, Andrew J.; Gilligan, Thomas J., III; Ciccia, Lawrence P.; and Martin, John F., 4,503,091, Cl. 427-180.000.
Martini, Leo A. Vibratory rotary drilling tool. 4,502,552, Cl. 175-56.000.
Martino, Phillip C.; and Winner, Peter P., to SCM Corporation. Self-curing water dispersed polymer blends. 4,503,173, Cl. 523-407.000.
Martus, Don. Chambered bottle cap. 4,502,604, Cl. 215-206.000.
Maruyama Industrial Co., Ltd.: *See*—
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Maruzen Oil Co., Ltd.: *See*—
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Mashine, Hiroyoshi: *See*—
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Masia, Michael: *See*—
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Masino, Albert P.; Cowan, Kiplin D.; and Hawley, Gil R., to Phillips Petroleum Company. Polyolefin polymerization process and catalyst. 4,503,159, Cl. 502-111.000.
Mason, Gary R.; Speaker, Kenneth W.; Macropol, James L.; McKie, Robert A.; and Bailin, Sidney C., to Eaton Corporation. Controlled work flow system. 4,503,499, Cl. 364-200.000.
Massardo, Pietro: *See*—
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Matsuhisa, Tsuneyasu: *See—*
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Matsumaru, Akihiko, to Nippon Mektron Ltd. Keyboard switch. 4,503,294, Cl. 200-5.00A.
Matsumoto, Hiroshi; Nawata, Yoshiaki; and Toda, Tsuneo, to Tokyo Shibaura Denki Kabushiki Kaisha. Sorting device for use with a document reproduction machine. 4,502,776, Cl. 355-14.0SH.
Matsumoto, Hiroyuki, to Tsukasa Kasei Kogyo Kabushiki Kaisha. Polypropylene strap and method of manufacturing the same. 4,503,007, Cl. 264-210.700.
Matsumoto, Kenji; Kawashima, Kazuharu; and Hayashi, Jun, to Fuji Photo Film Co., Ltd. Method of modifying surface of colored microfilter element. 4,503,134, Cl. 430-7.000.
Matsumoto, Yasushi: *See—*
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Matsunaga, Katsutoshi: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Murakami, Mutsuaki; Hiromori, Yasutaka; and Naito, Hiroshi, 4,503,118, Cl. 428-323.000.
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Matsushita Electric Works, Ltd.: *See—*
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Matsushita Electronics Corporation: *See—*
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Matsushita, Kouzi: *See—*
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Matsuura, Hitoshi: *See—*
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Mattelon, Jean-Claude; and Chauzu, Albert, to Les Cables De Lyon. Haulage machine for hauling an elongate cylindrical unit. 4,502,666, Cl. 254-134.3FT.
Matth. Hohner AG: *See—*
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Matunaga, Masatugu: *See—*
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Maupetit, Philippe; and Demoulin, Bernard, to Laboratoires Biotrol S.A. Paste for protecting the skin. 4,503,034, Cl. 424-80.000.
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Maurer, Fritz; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Combating pests with novel substituted N,N-dimethyl O-pyrimidin-4-yl carbamates. 4,503,057, Cl. 514-269.000.
Mauri, Ambrogio. Power drive system for road vehicles. 4,502,558, Cl. 180-14.300.
Mayhew, Raymond L.; and O'Lenick, Anthony J., to Mona Industries, Inc. Phosphate quaternary compounds. 4,503,002, Cl. 260-945.000.
Mazda Motor Corporation: *See—*
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Mazzorana, Alfred B., to Societe de Paris et du Rhone. System for controlling the advance and rotation of the actuator of a starter for heat engine. 4,503,338, Cl. 290-38.00R.
McAnney, William H., to International Business Machines Corporation. Parallel path self-testing system. 4,503,537, Cl. 371-25.000.
McCabe, Joseph H., III: *See—*
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McCaskill, Rex A.: *See—*
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McClellan, W. Roy, III; Girvin, Richard J.; and Conner, William A., to Rockwell International Corporation. Maintaining frequency accuracy in single sideband repeaters. 4,503,562, Cl. 455-22.000.
McClung, Carl L.: *See—*
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McConway & Torley Corporation: *See—*
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McCoy, Walter T. Hydraulic applications. 4,502,280, Cl. 60-567.000.
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McCully, Michael D.: *See—*
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McDaniel, Max P.; and Stricklen, Phil M., to Phillips Petroleum Company. Polymerization with CO reduced chromyl halide on silica catalyst. 4,503,201, Cl. 526-106.000.
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McElroy, David J., to Texas Instruments Incorporated. Electrically erasable dual-injector floating gate programmable memory device. 4,503,524, Cl. 365-218.000.
McFarland, Harry G.: *See—*
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McGhee, Edward C.; and Beam, Harold D., to Nordson Corporation. Nozzle assembly for electrostatic spray guns. 4,502,629, Cl. 239-3.000.
Mc Keon, Ronald J.: *See—*
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McKie, Robert A.: *See—*
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McLaughlin, Robert C.: *See—*
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McNamara, Dennis J.: *See—*
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McPherson, Roger K., to Texas Instruments Incorporated. Method of making high density VMOS electrically-programmable ROM. 4,502,208, Cl. 29-584.000.
McShane, Herbert F., Jr.; Plimmer, Peter N.; and Stewart, Charles W., to Du Pont de Nemours, E. I., and Company. Cured elastomers with improved high temperature tear strength. 4,503,192, Cl. 525-192.000.
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Meiers, Gerald F., to Deere & Company. Twine tensioner for large round bale twine-wrapping mechanism. 4,502,646, Cl. 242-149.000.
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Meller, Theo; Knecht, Heinz; Kohberg, Ewald; and Lohr, Karl-Heinz, to BOGE GmbH. Self pumping, hydropneumatic, telescopic, spring damping device with internal level regulation. 4,502,672, Cl. 267-64.170.
Melton, Keith: *See—*
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Messina, Benedicto U.: *See*—
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Lohrberg, Karl; Kohl, Peter; and Haas, Gunter, 4,502,935, Cl. 204-253.000.
Metz, Josef; and Zielinski, Erich, to Rheinmetall GmbH. Hydraulic recoil brake system for braking the gun barrel recoil movement after the firing traverse. 4,502,366, Cl. 89-43.00R.
Meudt, Gottfried: *See*—
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Mezger, Hans, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Reciprocating piston combustion engine with water injection. 4,502,420, Cl. 123-25.00C.
Michael, Frank W.: *See*—
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Knecht, George W., 4,503,293, Cl. 200-50.00B.
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DeVries, Henry L.; Roth, Myron A., Jr.; and Roth, William A., 4,502,741, Cl. 312-108.000.
Mihara, Nobuaki, to Noritsu Kenkyu Center Co. Ltd. Apparatus for treating disc films. 4,502,772, Cl. 354-312.000.
Mikulski, Walter J. Visual communication device. 4,503,426, Cl. 340-711.000.
Miles, Ronald C.; Geren, George W.; and Peel, R. W., to Olin Corporation. Method of making reference electrode. 4,502,214, Cl. 29-859.000.
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Miller, Arthur J.; and Moussa, Zaher M., to Elliott Turbomachinery Co., Inc. Solid wheel turbine. 4,502,838, Cl. 415-202.000.
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Miller, Granville G.: *See*—
Delannoy, Philippe G.; Miller, Granville G.; Eckhardt, Helmut; and Baughman, Ray H., 4,502,981, Cl. 252-512.000.
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Miller, Jack V., to Gravity Guidance, Inc. Full body weight traction device. 4,502,682, Cl. 272-144.000.
Miller, James R.; Fayerman, Jeffrey T.; Kovacevic, Steven; and Beerman, Nancy E., to Eli Lilly and Company. Multifunctional, cloning vectors for use in Streptomyces, Bacillus, and *E. coli* . 4,503,155, Cl. 435-172.300.
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Minami, Kenji; Kawata, Yoshimasa; Ushio, Tetsuji; Tani, Hoshiro; and Mitani, Kazuhisa, to Nippon Steel Corporation; and Mishima Kosan Company, Limited. Method for repairing a mold for continuous casting of steel. 4,502,924, Cl. 204-16.000.
Minami, Tatsuo, to Nissan Shatai Co., Ltd. Device for catching a fully opened slide door. 4,502,246, Cl. 49-322.000.
Minatelli, John A.; and Ma, Shih-Yu, to Uniroyal, Inc. Alkylation of substituted sulfonylpyridines. 4,503,230, Cl. 546-294.000.
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Ou-Yang, David T., 4,503,123, Cl. 428-349.000.
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Minnick, Michael G.; and Weisz, Robert O., to Essex Group, Inc. RF Suppressing magnet wire. 4,503,284, Cl. 174-36.000.
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Minami, Kenji; Kawata, Yoshimasa; Ushio, Tetsuji; Tani, Hoshiro; and Mitani, Kazuhisa, 4,502,924, Cl. 204-16.000.
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Miyai, Seiichi; Nakajima, Kaoru; and Somezawa, Masashi, to Sony Corporation. Electron radiation curable resin. 4,503,198, Cl. 525-440.000.
Miyake, Kimio; and Sugimoto, Kiyoshi, to Kabushiki Kaisha Komatsu Seisakusho. Control system for push-pull unit mounted on motor scraper. 4,502,235, Cl. 37-127.000.
Miyamoto, Noriaki; and Inoue, Norio, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Spinning rotor in an open-end spinning frame. 4,502,273, Cl. 57-414.000.
Miyamoto, Tomohisa: *See*—
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Moller, Thomas A., to FMC Corporation. Telescoping boom supported clustered service line. 4,502,505, Cl. 137-615.000.
Mollison, Alistair N., to Du Pont of Canada, Inc. Pouches of ethylene-α-olefin copolymer/ethylene-vinyl acetate copolymer blends. 4,503,102, Cl. 428-35.000.
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Monfort, Archie. Holder of sheet music. 4,502,657, Cl. 248-451.000.
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Nickson, Thomas E., 4,503,276, Cl. 568-936.000.
Montagu, Jean I., to General Scanning, Inc. Resonant actuator for optical scanning. 4,502,752, Cl. 350-6.600.
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Moore, Franklin, Jr.; and Fultz, Clinton. Precise volume, disposable food container. 4,502,623, Cl. 229-1.50B.
Moore, William A.; and Lewis, Michael M., to Dow Corning Wright. Adjustable length prosthetic joint implant. 4,502,160, Cl. 3-1.900.
Moos, Niklaus J., to Versatile Corporation. Wing back implement. 4,502,546, Cl. 172-311.000.
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Mori, Etsunori: *See*—
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Mori, Leo; Aoba, Takashi; and Tominaga, Mamoru, to Tokyo Shibaura Denki Kabushiki Kaisha. Rear projection screen. 4,502,755, Cl. 350-128.000.
Mori, Teruo; Shirai, Hiroshi; Kakei, Tsutomu; Matsuhisa, Tsuneyasu; and Watanabe, Masaru, to Fuji Photo Film Co., Ltd. Apparatus for electrolytic treatment to metal web. 4,502,933, Cl. 204-206.000.
Mori, Yoshifumi; and Matsuda, Osamu, to Sony Corporation. Semiconductor laser. 4,503,539, Cl. 372-45.000.
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Morita, Masahiko; Mano, Junichi; Nishida, Minoru; Tanaka, Tomoo; Aoyagi, Nobuo; and Takizawa, Syoichi, to Kawasaki Steel Corporation. Method for producing hot-rolled steel sheets having a low yield ratio and a high tensile strength due to dual phase structure. 4,502,897, Cl. 148-12.00F.
Moritoki, Masato; Fujikawa, Takao; Kitagawa, Kazuo; and Miyanaga, Junichi, to Kabushiki Kaisha Kobe Seiko Sho. Heater for hot isostatic pressing apparatus. 4,503,319, Cl. 219-390.000.
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Morris, Roy E.; and Lynch, Cornelius E., Jr. Child proof seat belt. 4,502,194, Cl. 24-633.000.
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Mottram, William R.; Fisher, Gene A.; and Feierabend, Louis, to Proto-Med, Inc. Method and apparatus for concentrating oxygen. 4,502,873, Cl. 55-179.000.
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Moxon, Edwin C., to Stypher Corporation. Chassis for electronic circuitry. 4,503,484, Cl. 361-395.000.
Moyer, Mark C.; Petersen, Clifford W.; Kusenberger, Felix N.; Perry, William D.; Balter, Floyd A.; and Teller, Cecil M., II, to Exxon Production Research Co. Method and apparatus for detecting flaws in the threaded end of an elongate member using electromagnetic excitation and an automated scanning sensor. 4,503,393, Cl. 324-235.000.
Mozdzen, Edward C., to Phillips Petroleum Company. Hydrogenation of phenols. 4,503,273, Cl. 568-816.000.
Mrenna, Stephen A.; Thomas, Glenn R.; and Haugh, Charles E., to Westinghouse Electric Corp. Molded case circuit breaker apparatus having trip bar with flexible armature interconnection. 4,503,408, Cl. 335-35.000.
Mross, Wolf D.: *See*—
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Mueller, Dale A., to Honeywell Inc. Furnace control apparatus having a circulator failure detection circuit for a downflow furnace. 4,502,625, Cl. 236-11.000.
Mueller, Jakob, to Textilma, AG. Strap fabric and method of and machine for manufacturing the strap fabric. 4,502,513, Cl. 139-383.00R.
Mukerji, Sushim, to Du Pont de Nemours, E. I., and Company. Rotating seal for continuous flow centrifuge. 4,502,699, Cl. 277-74.000.
Muller, Klaus: *See*—
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Murakami, Hideo: *See*—
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Murakami, Mutsuaki; Hiromori, Yasutaka; and Naito, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Ink jet recording sheet. 4,503,118, Cl. 428-323.000.
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Muramatsu, Akira, to Hitachi, Ltd. Semiconductor integrated circuit device and fabrication method thereof. 4,502,201, Cl. 29-571.000.
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Murase, Kazuo; Watanabe, Toshihiko; Takeuchi, Naoki; and Maruyama, Tokuji, to Kabushiki Kaisha Kobe Seiko Sho. DC Welding power supply system. 4,503,316, Cl. 219-130.320.
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Musin, Rafail M.; Gryaznov, Mikhail I.; and Timofeev, Dmitry A. Device for pulse measurement and conversion. 4,503,544, Cl. 375-10.000.
Muth, Stephan R. W. Sheet folding method and product. 4,502,711, Cl. 281-5.000.
Naden, David; Webster, David G.; and Willey, Gordon, to Davy McKee (Stockton) Limited. Control device. 4,502,952, Cl. 210-86.000.
Nadori nee Kozel, Gizella: *See*—
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Nagase, Masaomi; and Miyagi, Hideo, to Toyota Jidosha Kabushiki Kaisha. Controlling device for quantity of fuel injection in diesel engine. 4,502,439, Cl. 123-357.000.
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Nagy, Louis L.; and O'Rourke, Michael J., to General Motors Corporation. Microwave probe for measurement of dielectric constants. 4,503,384, Cl. 324-61.00P.
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Ueno, Haruo; Ashitaka, Hidetomo; and Nakajima, Koichi, 4,503,202, Cl. 526-140.000.
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Shibuya, Tsunenori; Ishizuka, Yutaka; and Nakamura, Teruo, 4,502,854, Cl. 418-15.000.
Nakanishi, Kiyoshi: *See*—
Okumura, Takeshi; Nakanishi, Kiyoshi; and Inoue, Tokuta, 4,502,432, Cl. 123-188.00M.
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Kelly, Gordon E.; Merrell, Richard G.; and Nakanishi, Mutsuo, 4,503,462, Cl. 358-122.000.
Nakano, Masao: *See*—
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Nakano, Motoo: *See*—
Kamioka, Hajime; Takagi, Mikio; Sato, Noriaki; Nakano, Motoo; and Iwai, Takashi, 4,503,315, Cl. 219-121.0LE.
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Nakashima, Hisao; Umeda, Jun-ichi; Kuroda, Takao; Kajimura, Takashi; and Matsuda, Hiroshi, to Hitachi, Ltd. Phase-locked semiconductor laser device. 4,503,540, Cl. 372-47.000.
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Kato, Yasushi; Furukawa, Hisao; and Nakatsuka, Saori, 4,503,181, Cl. 524-391.000.
Nakayama, Shozo: *See*—
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Giddings, David M.; Ries, Donald G.; and Syrinek, Allen R., 4,502,964, Cl. 252-8.50C.
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Romberger, John A.; and Meier, Daniel A., 4,502,978, Cl. 252-389.00A.
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National Pen Corporation: *See*—
Liguori, Thomas, 4,502,381, Cl. 101-40.000.
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Harris, John D.; and Evans, Mervyn, 4,502,473, Cl. 128-92.00A.
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Nauta, Randal W., to C. L. Frost & Son, Inc. Wheeled support assembly for conveyors with locking and fastening feature. 4,502,738, Cl. 384-477.000.
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NCR Corporation: *See*—
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Pickard, Ronald D.; Reece, John W.; and Racette, Joseph W., 4,503,480, Cl. 361-152.000.
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Nedelec, Lucien; Gasc, Jean-Claude; and Fauveau, Patrick, to Roussel Uclaf. C-Homo-9-oxa-ergolines. 4,503,053, Cl. 514-239.000.
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Neff, Paul J. Storage unit. 4,502,742, Cl. 312-324.000.
Neidig, Arno; Akyurek, Altan; and Hettmann, Hubert, to Brown, Boveri & Cie AG. Electrical connecting strap for semiconductor components. 4,502,750, Cl. 339-275.00R.
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Nelson, Carl T., to Minnesota Mining and Manufacturing Company. Stethoscope with removable insert. 4,502,562, Cl. 181-131.000.
Nelson, Carl W.; and Vye, Michael B., to Xebec, Inc. Protective overcoating for magnetic recording discs and method for forming the same. 4,503,125, Cl. 428-408.000.
Nelson Robert A.: *See*—
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Nelson, Stephen R., to Kerr-McGee Refining Corporation. Fractionation of heavy hydrocarbon process material. 4,502,944, Cl. 208-45.000.
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Nepsco, Inc.: *See*—
Sheldon, Samuel B.; Leach, Jack L.; and Harkness, Scott A., 4,502,728, Cl. 297-284.000.
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Neufeld, Jacob, to Halliburton Company. Evaluation of the interaction with radiant energy of substances traversed by a borehole. 4,503,328, Cl. 250-262.000.
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Commer, Johann; Neuhaus, Wulf-Dieter; and Schmidt, Volkmar, 4,502,230, Cl. 34-57.00E.
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New Nippon Electric Co., Ltd.: *See*—
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Newell, Chester W., to Newell Research Corporation. ANSI-Compatible tape cartridge with oversize tape width. 4,502,648, Cl. 242-192.000.
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NGK Insulators, Ltd.: *See*—
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NGK Spark Plug Co., Ltd.: *See*—
Yokoi, Shinichi; and Ito, Tsuneo, 4,502,430, Cl. 123-145.00A.
Nguyen, Tan V. Flash contact printer. 4,502,781, Cl. 355-79.000.
Nickson, Thomas E., to Monsanto Company. Process for separating nitration isomers of substituted benzene compounds. 4,503,276, Cl. 568-936.000.
Nicoll, Andrew R., to BBC Aktiengesellschaft Brown, Boveri & Cie. High-temperature protection layer. 4,503,122, Cl. 428-678.000.
Nicolon Corporation: *See*—
Scales, John M.; and Wolcott, Bernard F., 4,502,815, Cl. 405-17.000.
Nielsen, Torben G.: *See*—
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Nielsen, Uffe D., to Wavin B.V. Tubular pipe part for coaxial heat exchange. 4,502,533, Cl. 165-154.000.
Nienart, Louis F.: *See*—
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Nigam, Anil, to SyQuest Technology. Disc drive cartridge arrangement. 4,503,474, Cl. 360-133.000.
Nightingale, Douglas J.; and Szuminski, Gary F., to Rolls-Royce Inc. Variable geometry ejector nozzle for turbomachines. 4,502,636, Cl. 239-265.170.
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Szuminski, Gary F.; Nightingale, Douglas J.; and Tape, Robert F., 4,502,638, Cl. 239-265.290.
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Nilssen, Ole K. Electronic ballast circuit for fluorescent lamps. 4,503,363, Cl. 315-225.000.
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Nakata, Shuji; Kawaguchi, Yoshio; and Aono, Susumu, 4,503,312, Cl. 219-117.100.
Nippon Cable System Inc.: *See*—
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Nippon Oil Co., Ltd.: *See*—
Ikematsu, Masaki; Honzyo, Isao; and Sakai, Kazuo, 4,502,950, Cl. 208-309.000.
Nippon Seiko Kabushiki Kaisha: *See*—
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Nishiguchi, Fumio, to Nissan Motor Company, Limited. Turbocharger. 4,502,849, Cl. 417-407.000.
Nishijima, Hideo; Fukushima, Isao; Teshima, Tsunehiko; Kobori, Yasunori; and Ito, Takayasu, to Hitachi, Ltd. Power supply for plural brushless DC motors. 4,503,369, Cl. 318-254.000.
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Hamai, Kyugo; Nakai, Meroji; Inoue, Ryusaburo; and Nakagawa, Yasuhiko, 4,502,454, Cl. 123-597.000.
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Nissan Shatai Co., Ltd.: *See*—
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Nobue, Tomotaka; and Kusunoki, Shigeru, to Matsushita Electric Industrial Co., Ltd. High frequency heating appliance. 4,503,306, Cl. 219-10.55F.
Nock, Hans, to Hafele KG. Device for perpendicularly joining furniture panels. 4,502,810, Cl. 403-231.000.
Noda, Ippei; and Ogiso, Osamu, to Takemoto Yushi Kabushiki Kaisha. Lubricating agents for processing fibers and method of processing thermoplastic synthetic fiber filaments therewith. 4,502,968, Cl. 252-8.800.
Nogawa, Tadao: *See*—
Ohura, Yukio; Hatta, George; and Nogawa, Tadao, 4,502,740, Cl. 29-148.460.

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Nowack, Gerhard P.; Johnson, Marvin M.; and Tabler, Donald C., to Phillips Petroleum Company. Hydrogenation catalysts. 4,503,249, Cl. 564-385.000.

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Nozawa, Ryoichiro; Komiya, Hidetsugu; Kishi, Hajimu; Matsuura, Hitoshi; Yamazaki, Etsuo; and Sakurai, Hiroshi, to Fanuc Ltd. Method and apparatus for sensing present position in position control system. 4,503,372, Cl. 318-560.000.

Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Ohtsuki, Toshiaki, to Fanuc Ltd. Numerical control system. 4,503,373, Cl. 318-570.000.

Nusse, Theo, to Nixdorf Computer AG. Image reproducing apparatus. 4,503,463, Cl. 358-148.000.

Nussle, Gerard: *See*—
Herzog, Siegfried; Jordan, Hans-Peter; Nolscher, Henryk; Bauer, Wilhelm; Grabner, Christian; Klein, Wilhelm; Krugener, Rolf; Bausch, Max; and Nussle, Gerard, 4,502,759, Cl. 350-636.000.

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Oak Industries Inc.: *See*—
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Oda, Yukio: *See*—
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Ogata, Hisanao; Nemoto, Takeo; Hakuraku, Yoshinori; and Yagi, Yasuomi, to Hitachi, Ltd. Cryostat. 4,502,296, Cl. 62-514.00R.

Ogawa, Hideaki: *See*—
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Ogiso, Osamu: *See*—
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Ogura, Masahiko, to Tokyo Shibaura Denki Kabushiki Kaisha. Display apparatus incorporated in an image-forming apparatus. 4,503,407, Cl. 333-14.00C.

Ohgaki, Katuyoshi: *See*—
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Ohi, Shinichi, to Diesel Kiki Co., Ltd. Rotational speed sensor for vane compressors. 4,502,853, Cl. 418-2.000.

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Ohshima, Jiro; Abe, Masahiro; and Koshino, Yutaka, to Toshiba Shibaura Denki Kabushiki Kaisha. Wiring material for semiconductor device and method for forming wiring pattern therewith. 4,502,207, Cl. 29-576.00B.

Ohtsuki, Toshiaki: *See*—
Nozawa, Ryoichiro; Nagamine, Tsuyoshi; Kawamura, Hideaki; and Ohtsuki, Toshiaki, 4,503,373, Cl. 318-570.000.

Ohuchi, Kazunori, to Tokyo Shibaura Denki Kabushiki Kaisha. Active pull-up circuit. 4,503,343, Cl. 307-482.000.

Ohura, Yukio; Hatta, George; and Nogawa, Tadao, to Nippon Seiko Kabushiki Kaisha. Method of making a retainer for solid type roller bearing. 4,502,740, Cl. 29-148.460.

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Okabe, Shinsuke, to Monarch Marking Systems, Inc. Print head. 4,502,383, Cl. 101-111.000.

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Okamoto, Masataka: *See*—
Kato, Eiichi; Okamoto, Masataka; Ueda, Hiroshi; and Inaba, Masaharu, 4,502,984, Cl. 252-518.000.

Okano, Michiaki: *See*—
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Okazaki, Hiroshi: *See*—
Kazaoka, Kenichi; and Okazaki, Hiroshi, 4,502,730, Cl. 297-366.000.

Okuda, Naoki; Usui, Akihiko; Yamamoto, Shigeaki; and Natsume, Shogo, to Kabushiki Kaisha Kobe Seiko Sho. Shielded metal arc welding electrode for Cr-Mo low alloy steels. 4,503,129, Cl. 428-562.000.

Okumura, Katsuya; Shinki, Toshinori; Sato, Takashi; and Ueda, Masaaki, to Tokyo Shibaura Denki Kabushiki Kaisha. Method for manufacturing semiconductor device. 4,502,210, Cl. 29-591.000.

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Kitabayashi, Yukio; Takahashi, Noriyoshi; Watanabe, Masatoshi; Okuyama, Toshiaki; and Tanaka, Yoji, 4,503,377, Cl. 318-807.000.

Olah, George A., to Atochem. Process for the preparation of octane boosting branched aliphatic ethers using solid superacid catalysts. 4,503,263, Cl. 568-694.000.

Olbrich, Hazel C.; and O'Rear, Dennis J., to Chevron Research Company. Process for preparing olefins at high pressure. 4,502,945, Cl. 208-120.000.

O'Lenick, Anthony J.: *See*—
Mayhew, Raymond L.; and O'Lenick, Anthony J., 4,503,002, Cl. 260-945.000.

Olin Corporation: *See*—
Gray, Thomas J.; Masse, Norman G.; and Hagstrom, Richard A., 4,503,251, Cl. 564-450.000.
Miles, Ronald C.; Geren, George W.; and Peel, R. W., 4,502,214, Cl. 29-859.000.
O'Connor, James M.; Lickei, Donald L.; and Rosin, Michael L., 4,503,199, Cl. 525-455.000.
Tang, Kuo-Chang; and Berkowitz, Phillip T., 4,503,226, Cl. 544-193.000.

Oliver, William R.: *See*—
Degironimo, Bruno; Silverman, Neil D.; Oliver, William R.; and Rideout, Eugene C., 4,502,488, Cl. 128-692.000.

Olson, David R.: *See*—
Wilson, Michael E.; Olson, David R.; Stone, Walter H.; and MacDonald, Robin B., 4,502,956, Cl. 210-248.000.

Olympus Optical Co., Ltd.: *See*—
Ida, Masatoshi; Oinoue, Kenichi; Aoki, Masahiro; and Hayashi, Asao, 4,503,467, Cl. 358-212.000.
Karaki, Kouichi, 4,503,458, Cl. 358-75.000.

Omori, Mamoru; and Takei, Humihiko, to Omori, Mamoru. Composite silicon carbide sintered shapes and its manufacture. 4,502,983, Cl. 252-516.000.

Omron Tateisi Electronic Co.: *See*—
Suzuki, Yasuo, 4,503,503, Cl. 364-405.000.

Omura, Kiyoharu, to Nippon Steel Corporation. Batch annealing apparatus. 4,502,671, Cl. 266-256.000.

Omura, Satoshi; and Shimizu, Hideki, to Kitasato Institute, The. Process for preparing antibiotic AM-2604-A. 4,503,152, Cl. 435-118.000.

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Ono Pharmaceutical Co., Ltd.: *See*—
Sakai, Yoshiki; Imaki, Katsuhiro; and Muryobayashi, Takashi, 4,503,068, Cl. 514-412.000.

O'Rear, Dennis J.: *See*—
Olbrich, Hazel C.; and O'Rear, Dennis J., 4,502,945, Cl. 208-120.000.

O'Rourke, Michael J.: *See*—
Nagy, Louis L.; and O'Rourke, Michael J., 4,503,384, Cl. 324-61.00P.

Osada, Kimio: *See*—
Kamei, Taketo; and Osada, Kimio, 4,503,358, Cl. 315-58.000.

Osaki, Yoshihiko: *See*—
Hoshikawa, Toru; and Osaki, Yoshihiko, 4,503,304, Cl. 219-10.49R.

Osawa, Nobuyuki, to Nippon Seiko Kabushiki Kaisha. Slide way bearing. 4,502,737, Cl. 308-6.00C.

Oshiage, Katsunori: *See*—
Kanegae, Hidetoshi; Oshiage, Katsunori; Yamamoto, Akito; and Hosaka, Akio, 4,502,446, Cl. 123-479.000.

Oshima, Toshio, to Nippon Electric Co., Ltd. Control signal generator for a television signal codec. 4,503,455, Cl. 358-19.000.

Oshinsky, Frank W., to McConway & Torley Corporation. Patterns for a coupler yoke casting. 4,502,525, Cl. 164-241.000.

Otis Engineering Corporation: *See*—
Setterberg, John R., Jr., 4,502,536, Cl. 166-105.500.
Thurman, Robert L.; and Williamson, Jimmie R., Jr., 4,502,542, Cl. 166-325.000.

Otobe, Yutaka, to Honda Motor Co., Ltd. Method for controlling control systems for internal combustion engines immediately after termination of fuel cut. 4,502,448, Cl. 123-480.000.

Otsuka, Kazuo; Narasaka, Shin; and Hasegawa, Shumpei, to Honda Motor Co., Ltd. Electronic circuit for vehicles, having a fail safe function for abnormality in supply voltage. 4,503,479, Cl. 361-90.000.

Ou-Yang, David T., to Minnesota Mining and Manufacturing Company. Inner seal for capped containers. 4,503,123, Cl. 428-349.000.

Ouhata, Koukichi; and Sugawara, Hiroyuki, to Hitachi, Ltd. Cathode-ray tube. 4,503,357, Cl. 315-1.000.

Outboard Marine Corporation: *See*—
Hansen, Loren F.; and Hicks, John E., 4,502,271, Cl. 56-320.100.

Outhwaite, George F., to Hughes Tool Company. Riser union with curved seat. 4,502,543, Cl. 166-359.000.

Owen, Hartley: *See*—
Haddad, James H.; Owen, Hartley; and Schatz, Klaus W., 4,502,947, Cl. 208-161.000.

Owens-Corning Fiberglas Corporation: *See*—
Perry, Brian D.; and Mathews, Paul K., 4,502,409, Cl. 118-410.000.

Owens-Illinois, Inc.: *See*—
Burrell, David E., 4,502,624, Cl. 229-41.00C.

Owens, Troy R., to Charles Greiner And Company, Inc. Stabilizer for cervical collar. 4,502,471, Cl. 128-75.000.

Oy Fiskars AB: *See*—
Carter, Larry D.; and Call, Daniel D., 4,502,218, Cl. 30-138.000.
Carter, Larry D., 4,502,254, Cl. 51-214.000.

Ozawa, Kazuo: *See*—
Fujiwara, Hiroshi; Yamazaki, Hatsutaro; and Ozawa, Kazuo, 4,503,271, Cl. 568-799.000.

P and C Engineering and Development: *See*—
Collins, Michael T., 4,502,698, Cl. 277-43.000.

Paar, Michael S., to General Motors Corporation. Lash adjuster with follower body retainer. 4,502,428, Cl. 123-90.460.

Pace, Aldren M.: *See*—
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Miller, Robert E.; Mudge, Ronald K.; Pace, Aldren M.; and Van Allen, Kent, 4,502,318, Cl. 73-3.000.

Pachmayr Gun Works, Inc.: *See*—
Farrar, Jack R.; and Farrar, Frank W., 4,502,238, Cl. 42-72.000.

Pacifici, James G.; and Blankenship, Allen J., to Eastman Kodak Company. Preparation of monochlorohydroquinone. 4,503,268, Cl. 568-765.000.

Paddock, Gary V., to Research Corporation. Recombinant cDNA construction method and hybrid nucleotides useful in cloning. 4,503,151, Cl. 435-68.000.

Page, Michel, to United States of America, Army. Multipoint fiber optic junction terminal. 4,503,532, Cl. 370-1.000.

Pagels, Louis T.: *See*—
Weiler, Gerhard H.; Anderson, Paul A.; and Pagels, Louis T., 4,502,614, Cl. 222-148.000.

Palcon Corporation: *See*—
Sarantitis, Anthony, 4,502,628, Cl. 238-122.000.

Pann, Keh, to Mobil Oil Corporation. Method for enhancement of the signal-to-noise ratio in seismic reflection signals. 4,503,527, Cl. 367-53.000.

Pansiera, Timothy T. Hinge means for orthopedic brace. 4,502,472, Cl. 128-80.00F.

Panzer, Gary W., to General Dynamics. Digital circuit unit testing system utilizing signature analysis. 4,503,536, Cl. 371-25.000.

Papastavros, Demos. Turbine power plant system. 4,502,277, Cl. 60-39.181.

Pape, Peter: *See*—
Stewen, Wilhelm; and Pape, Peter, 4,502,922, Cl. 202-248.000.

Papp, Robert G. Wrist and hand support device. 4,502,688, Cl. 273-189.00A.

Paradyne Corporation: *See*—
Bremer, Gordon; and Wachtel, Robert, 4,503,545, Cl. 375-34.000.

Parikh, Shyam C.: *See*—
Hinlein, Sigmund; and Parikh, Shyam C., 4,503,530, Cl. 369-270.000.

Park, Arthur; and Wilson, Bob T., to Diamond Oil Well Drilling. Sponge coring apparatus with reinforced sponge. 4,502,553, Cl. 175-59.000.

Parke, Davis & Company: *See*—
Behme, Werner, 4,502,358, Cl. 83-700.000.

Parker, William L.: *See*—
Sykes, Richard B.; and Parker, William L., 4,503,218, Cl. 549-320.000.

Pasco, William R.: *See*—
Young, William E.; Gerber, Ernst W.; and Pasco, William R., 4,502,906, Cl. 156-251.000.

Pask, George, to Rolls-Royce Limited. Casing structure for a gas turbine engine. 4,502,276, Cl. 60-39.320.

Pastor, Stephen D.: *See*—
Spivack, John D.; and Pastor, Stephen D., 4,503,243, Cl. 556-427.000.

Patacca, Angelo M.: *See*—
Belanger, Homer J.; and Patacca, Angelo M., 4,503,104, Cl. 428-36.000.

Patel, Anilbhai S.: *See*—
Gerhard, Gregory J.; Gornstein, Robert J.; Graham, William M.; Patel, Anilbhai S.; Smith, John M.; and Vaughn, Wade C., 4,502,162, Cl. 3-13.000.

Paton, Robert, to Biorganic Energy, Inc. Anaerobic digestion of organic waste for biogas production. 4,503,154, Cl. 435-167.000.

Patriarca, Jean. Adjustable supports for cycle saddles. 4,502,811, Cl. 403-391.000.

Patzold, Dieter; Schreiber, Alfons; and Tiwi, Peter, to ITT Industries, Inc. Floor-sweeping machine. 4,502,173, Cl. 15-41.00R.

Paulsen, Nick E. Farrowing pen. 4,502,414, Cl. 119-20.000.

Paust, Joachim; and Leininger, Hartmut, to BASF Aktiengesellschaft. Preparation of dihydro-4,4-dimethylfuran-2,3-dione. 4,503,238, Cl. 549-319.000.

Pauze, Denis R.: *See*—
Keane, John J.; and Pauze, Denis R., 4,503,124, Cl. 428-372.000.

Pavlin, Mark S., to Union Camp Corporation. Extraction of phenolics from hydrocarbons. 4,503,267, Cl. 568-753.000.

Peachtree Doors, Inc.: *See*—
Banford, Dennis W., 4,502,249, Cl. 49-381.000.

Pearson, Ernest J.: *See*—
Hayes, Michael H.; and Pearson, Ernest J., 4,502,211, Cl. 29-623.100.

Peck, George C.: *See*—
Giampapa, Vincent C.; and Peck, George C., 4,502,484, Cl. 128-317.000.

Peel, R. W.: *See*—
Miles, Ronald C.; Geren, George W.; and Peel, R. W., 4,502,214, Cl. 29-859.000.

Peluffo, Anna: *See*—
Francese, Renato; Fruttero, Roberta; Messori, Vittorio; and Peluffo, Anna, 4,502,881, Cl. 71-92.000.

Penhollow, Bert G. H.: *See*—
Currier, Stephen M.; Penhollow, Bert G. H.; Hof, Gordon G.; and Mast, Norbert L., 4,502,842, Cl. 417-8.000.

Perecman, Jack L., to Minnesota Mining and Manufacturing Company. Package and method of packaging resealable plastic bags. 4,502,599, Cl. 206-554.000.

Permanent Label Corporation: *See*—
Meador, Neil A., 4,502,380, Cl. 101-38.00R.

Permelec Electrode Ltd.: *See*—
Asano, Hiroshi; Shimamune, Takayuki; and Hirao, Kazuhiro, 4,502,931, Cl. 204-192.00C.

Perrey, Hermann: *See*—
Bornatsch, Wolfgang; Kuth, Robert; and Perrey, Hermann, 4,502,863, Cl. 8-524.000.

Perry, Brian D.; and Mathews, Paul K., to Owens-Corning Fiberglas Corporation. Apparatus for treating texturized strands and yarns. 4,502,409, Cl. 118-410.000.

Perry, Eugene H. Lever door handle. 4,502,719, Cl. 292-347.000.

Perry, John C. Rod lubrication means for two-cycle internal combustion engines. 4,502,421, Cl. 123-41.370.

Perry, John C. Lubrication means for a two-cycle internal combustion engine. 4,502,423, Cl. 123-41.380.

Perry, William D.: *See*—
Moyer, Mark C.; Petersen, Clifford W.; Kusenberger, Felix N.; Perry, William D.; Balter, Floyd A.; and Teller, Cecil M., II, 4,503,393, Cl. 324-235.000.

Pershon, Jacob A. Collapsible horse. 4,502,563, Cl. 182-153.000.

Persson, Torsten. Apparatus for turning a person confined to bed. 4,502,169, Cl. 5-88.000.

Pestellini, Vittorio; Ghelardoni, Mario; Giannotti, Danilo; Giolitti, Alessandro; Maggi, Carlo A.; Manzini, Stefano; Grimaldi, Guglielmo; and Meli, Alberto, to A. Menarini S.A.S. Derivatives of

1-alkylamine-3[4(p-alkyloxy-benzamide)phenoxy]-2-propanol, having beta-sympatholytic activity, their salts, and production processes thereof. 4,503,075, Cl. 514-622.000.

Pestka, Sidney; and Rubinstein, Menachem, to Hoffmann-La Roche Inc. Protein purification process and product. 4,503,035, Cl. 424-85.000.

Petersen, Clifford W.: *See*—
Moyer, Mark C.; Petersen, Clifford W.; Kusenberger, Felix N.; Perry, William D.; Balter, Floyd A.; and Teller, Cecil M., II, 4,503,393, Cl. 324-235.000.

Petersen, Hans C.; and Thomsen, Svend E., to Danfoss A/S. Rotary piston machine with parallel internal axes. 4,502,855, Cl. 418-15.000.

Petersen, Peter, to Allied Corporation. High-pressure vessel furnace. 4,502,531, Cl. 165-76.000.

Peterson, Craig B.: *See*—
Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., 4,503,534, Cl. 371-9.000.
Budde, David L.; Carson, David G.; Cornish, Anthony L.; Johnson, David B.; and Peterson, Craig B., 4,503,535, Cl. 371-11.000.

Peterson, Phillip R.; and Gavrielides, Athanasios, to United States of America, Navy. Bandpass filter formed by serial gratings operating in a Wood's anomaly region. 4,502,756, Cl. 350-162.200.

Petro, David J., to Avco Corporation. Compressor air bleed override control system. 4,502,275, Cl. 60-39.270.

Petrolite Corporation: *See*—
Buriks, Rudolf S.; and Dolan, James G., 4,502,977, Cl. 252-340.000.

Petrov, Pavel E.: *See*—
Trubitsyn, Alexandr V.; Fomin, Georgy M.; Nedovizy, Ivan N.; Petrov, Pavel E.; Denisov, Petr I.; Tulupov, Sergei A.; Chursin, Stepan T.; Kuptsynov, Vladimir N.; Merkulov, Adolf K.; and Stobbe, Lev G., 4,502,895, Cl. 148-11.50Q.

Peyronel, Jean-Francois: *See*—
Farge, Daniel; Roy, Pierre L.; Moutonnier, Claude; and Peyronel, Jean-Francois, 4,503,220, Cl. 544-16.000.

Pfaff Industriemaschinen GmbH: *See*—
Dietrich, Herbert; and Mall, Gunther, 4,502,356, Cl. 83-175.000.
Walther, Karl H., 4,502,400, Cl. 112-122.000.

Pfizer Inc.: *See*—
Barth, Wayne E., 4,502,990, Cl. 260-245.20R.
Barth, Wayne E., 4,503,040, Cl. 424-114.000.
Richardson, Kenneth; and Cooper, Kelvin, 4,503,063, Cl. 514-383.000.

Phalin, Thomas L.; and Ulmes, James J., to American Can Company. Tooling adjustment. 4,502,313, Cl. 72-342.000.

Philipp, Clemens: *See*—
Artz, Gerd; Figge, Dieter; Hoster, Thomas; and Philipp, Clemens, 4,502,526, Cl. 164-415.000.

Phillips, Glendale: *See*—
Phillips, Vanice C.; and Phillips, Glendale, 4,502,685, Cl. 273-29.00A.

Phillips, Jesse C., to Texas Instruments Incorporated. Timer with fast counter interrupt. 4,503,548, Cl. 377-39.000.

Phillips Petroleum Company: *See*—
Cheng, Paul J., 4,503,027, Cl. 423-450.000.
Kertok, Mark E., 4,502,858, Cl. 425-204.000.
Masino, Albert P.; Cowan, Kiplin D.; and Hawley, Gil R., 4,503,159, Cl. 502-111.000.
McDaniel, Max P.; and Stricklen, Phil M., 4,503,201, Cl. 526-106.000.
Mozdzen, Edward C., 4,503,273, Cl. 568-816.000.
Nowack, Gerhard P.; Johnson, Marvin M.; and Tabler, Donald C., 4,503,249, Cl. 564-385.000.
Shell, Francis J., 4,502,969, Cl. 252-8.55R.
Smith, Sanford N., 4,502,195, Cl. 28-255.000.
Tabler, Donald C., 4,502,948, Cl. 208-183.000.
Wishman, Marvin, 4,502,156, Cl. 2-181.000.

Phillips, Richard A.; and Haddad, Theodore A., to Foster Grant Corporation. Method of making an abrasion resistant coating on a solid substrate and articles produced thereby. 4,503,126, Cl. 428-412.000.

Phillips, Vanice C.; and Phillips, Glendale. Tennis serve practice device. 4,502,685, Cl. 273-29.00A.

Pickard, Ronald D.; Reece, John W.; and Racette, Joseph W., to NCR Corporation. Voltage compensating driver circuit. 4,503,480, Cl. 361-152.000.

Pierce, Jack D.: *See*—
Swallow, Roger T.; Jackson, William R.; and Pierce, Jack D., 4,502,301, Cl. 66-178.00A.

Pilat, John F., to Data General Corp. Apparatus and methods for deriving addresses of data using pointers whose values remain unchanged during an execution of a procedure. 4,503,492, Cl. 364-200.000.

Pinto, John G.: *See*—
Campbell, Nancy L.; Pinto, John G.; Drewe, John A.; Hayes, Patrick D.; and Nelson Robert A., 4,503,307, Cl. 219-10.55E.

Pinto, Patrick A.: *See*—
Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; Pinto, Patrick A.; and Versace, Richard W., 4,503,064, Cl. 514-210.000.

Pioneer Electronic Corporation: *See*—
Kato, Hiroshi, 4,503,531, Cl. 369-275.000.

Pirogov, Varlen K.: *See*—
Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.

Pittman, Leon M. Locking knife with thumb latch. 4,502,221, Cl. 30-160.000.

Placzek, Terrance M.: *See*—
King, Donald W.; and Placzek, Terrance M., 4,503,079, Cl. 426-54.000.

Plamann, Richard C.: *See*—
Stecker, Earl M.; and Plamann, Richard C., 4,502,617, Cl. 222-385.000.

Planatolwerk Willy Hesselmann, Chemische Und Maschinenfabrik Fur Klebetechnik GmbH & Co. KG: *See*—
Steiner, Erich; and Hesselmann, Theo, 4,502,912, Cl. 156-548.000.

Plasworld, Inc.: *See*—
Marsh, Robert E.; and Colburn, Michael H., 4,502,953, Cl. 210-94.000.

Plimmer, Peter N.: *See*—
McShane, Herbert F., Jr.; Plimmer, Peter N.; and Stewart, Charles W., 4,503,192, Cl. 525-192.000.

Plotnikov, Viktor I.: *See*—
Fastritsky, Viktor S.; Vingris, Laimonis T.; Ardentov, Vasily V.; Florinsky, Jury B.; Plotnikov, Viktor I.; Rodnevsky, Leonid A.; and Alexeev, Gennady N., 4,503,392, Cl. 324-232.000.

Plueddemann, Edwin P., to Dow Corning Corporation. Stabilization of aqueous silicates using alkali siliconates of silylorganosulfonates. 4,503,242, Cl. 556-401.000.

Pneumafil Corporation: *See*—
Levie, Lewis A.; and Fowler, Max J., 4,502,874, Cl. 55-283.000.

Podszus, Hans. Apparatus for making helical center-cored smokers' filters and method. 4,502,495, Cl. 131-328.000.

Poe, Lloyd R.: *See*—
Harmon, Raymond E.; and Poe, Lloyd R., 4,502,193, Cl. 24-621.000.

Poeppelmeier, Kenneth R.: *See*—
Beyerlein, Robert A.; Poeppelmeier, Kenneth R.; and Jacobson, Allan J., 4,503,166, Cl. 502-303.000.

Pogue, Russell W., Jr., to General Motors Corporation. Radio receiver system including a control unit and a remote unit. 4,503,513, Cl. 364-900.000.

Polak, James C., to General Motors Corporation. Pump drive mechanism. 4,502,350, Cl. 74-730.000.

Polar Pouch, Inc.: *See*—
Lief, Joseph R.; and McCully, Michael D., 4,503,558, Cl. 383-3.000.

Polaroid Corporation: *See*—
Bartels-Keith, James R.; Boggs, Roger A.; Puttick, Anthony J.; and Sofen, Nancy M., 4,503,139, Cl. 430-219.000.
Bronstein-Bonte, Irena Y.; Lindholm, Edward P.; and Murphy, Richard J., 4,503,138, Cl. 430-213.000.
Bruder, Alan H., 4,502,903, Cl. 156-153.000.
Gaewsky, John P.; and Murray, Joseph E., Jr., 4,502,773, Cl. 354-403.000.
Gaudiana, Russell A.; and Kalyanaraman, Palaiyur S., 4,503,248, Cl. 564-307.000.
Johnson, Bruce K.; and Triggs, Charles W., 4,502,767, Cl. 354-86.000.

Pole, Charles D. Conveyor apparatus. 4,502,590, Cl. 198-611.000.

Pollmann, Richard: *See*—
Breuninger, Axel; Pollmann, Richard; and Scheyrer, Peter, 4,503,094, Cl. 427-250.000.

Polster, Louis S. Deep fat cooking temperature control system. 4,503,320, Cl. 219-441.000.

Polysar Limited: *See*—
Rempel, Garry L.; and Azizian, Hormoz, 4,503,196, Cl. 525-338.000.

Ponce, Max; and Dumarcher, Gerard. Sanitary device for disposal of excretory matter of animals such as dogs. 4,502,413, Cl. 119-1.000.

Popchock, Richard T.: *See*—
Lech, Thaddeus, Jr.; and Popchock, Richard T., 4,502,582, Cl. 192-85.0AA.

Popovich, Robert P.: *See*—
Kulin, Ralph; Moncrief, Jack W.; Popovich, Robert P.; and Stauber, Ronald C., 4,503,333, Cl. 250-455.100.

Porn, Lawrence J.: *See*—
Kidd, Robert C.; and Porn, Lawrence J., 4,503,419, Cl. 340-59.000.

Porrot, Pascal: *See*—
Rougeolle, Daniel; and Porrot, Pascal, 4,503,453, Cl. 358-13.000.

Porzelius, Christian S. Apparatus for securing a toilet bowl lid closed. 4,502,167, Cl. 4-253.000.

Post, Kendall E.; and Henning, Paul N., to Amtel Communications, Inc. Automatic line supervisor for use with a call concentrator. 4,503,290, Cl. 179-18.0FC.

Potts, James E., to Union Carbide Corporation. Disposable articles coated with degradable water insoluble polymers. 4,503,098, Cl. 427-394.000.

Poubeau, Pierre: *See*—
Abiven, Henri; Beheydt, Andre ; Clermont, Michel; Delattre, Maurice; and Poubeau, Pierre, 4,502,349, Cl. 74-572.000.

Pozniak, Donald J.; Robertson, Gerald F.; and McClain, Michael J., to General Motors Corporation. Exhaust gas operated vacuum pump assembly. 4,502,847, Cl. 417-380.000.

Pozniak, Donald J.: *See*—
Robertson, Gerald F.; and Pozniak, Donald J., 4,502,848, Cl. 417-380.000.

Prat, Francois: *See*—
Hennechart, Jean-Paul; Bramaud, Bernard; and Prat, Francois, 4,502,408, Cl. 118-61.000.

Pratt Burnerd International Limited: *See*—
Jackson, Joseph F., 4,502,704, Cl. 279-111.000.

Precision Monolithics, Inc.: *See—*
Bowers, Derek F., 4,503,381, Cl. 323-315.000.
Price, Michael G.: *See—*
Zehl, Otis G.; Price, Michael G.; and David, Edward H., Jr., 4,503,382, Cl. 324-77.00K.
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Price Pfister, Inc.: *See—*
Szemeredi, Robert S.; Tarnay, Matthew G.; and Lee, Kenneth, 4,502,165, Cl. 4-192.000.
Prince Industrial Development Co., Ltd.: *See—*
Yoshinaga, Sadao; Tajiri, Yoshinobu; and Mashine, Hiroyoshi, 4,502,465, Cl. 126-409.000.
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Brabbs, William J.; and Hong, Charles A., 4,503,080, Cl. 426-94.000.
Robson, Peter, 4,502,986, Cl. 252-526.000.
Pronk, Gerrit J., to Shell Oil Company. Process for the complete replacement of particles in vessels. 4,502,946, Cl. 208-152.000.
Protective Treatments, Inc.: *See—*
Smith, Donald E., 4,502,259, Cl. 52-208.000.
Proto-Med, Inc.: *See—*
Mottram, William R.; Fisher, Gene A.; and Feierabend, Louis, 4,502,873, Cl. 55-179.000.
Puhaczewski, Paul R.: *See—*
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Q-Panel Corporation: *See—*
Albee, Percy F., Jr., 4,502,654, Cl. 248-168.000.
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Keysell, F. Kerry; and Lawrence, Robert G., 4,502,416, Cl. 119-51.110.
R. J. Reynolds Tobacco Company: *See—*
Clark, Douglas C., 4,502,587, Cl. 198-347.000.
Raab, Herman P., to Consolidated Investments and Development Corp. Multiplex system for monitoring engine status. 4,503,431, Cl. 340-870.130.
Racette, Joseph W.: *See—*
Pickard, Ronald D.; Reece, John W.; and Racette, Joseph W., 4,503,480, Cl. 361-152.000.
Racor Industries, Inc.: *See—*
Schaupp, Richard E., 4,502,955, Cl. 210-149.000.
Wilson, Michael E.; Olson, David R.; Stone, Walter H.; and MacDonald, Robin B., 4,502,956, Cl. 210-248.000.
Racy, Joseph E., to Sanders Associates, Inc. Primed microwave oscillator. 4,503,404, Cl. 331-96.000.
Radl, Franz: *See—*
Schimko, Reinhold; Radl, Franz; and Fuchs, Max, 4,502,300, Cl. 66-71.000.
Ragot, Roger A ; and Wolf, Claude J., to Equipements Automobiles Marchal. Stamped connector fittings for windscreen wiper arms. 4,502,178, Cl. 15-250.340.
Raiman, Clifford, to Chaparral Communications, Inc. Rotation of microwave signal polarization using a twistable, serpentine-shaped filament. 4,503,379, Cl. 333-21.00A.
Rain Bird Sprinkler Mfg. Corp.: *See—*
Christen, Hans D., 4,502,631, Cl. 239-106.000.
Raj, Kuldip: *See—*
Gowda, Hanumaiah L.; and Raj, Kuldip, 4,502,700, Cl. 277-80.000.
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Rampon Products, Inc.: *See—*
Swallow, Roger T.; Jackson, William R.; and Pierce, Jack D., 4,502,301, Cl. 66-178.00A.
Randklev, Ronald M., to Minnesota Mining and Manufacturing Company. Radiopaque, low visual opacity dental composites containing non-vitreous microparticles. 4,503,169, Cl. 523-117.000.
Raskai, Magda: *See—*
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DasGupta, Sumit; Graf, Matthew C.; Rasmussen, Robert A.; and Williams, Thomas W., 4,503,386, Cl. 324-73.00R.
Ratliff, Raymond W.; and Smith, Eugene E. Destructible toy aircraft game. 4,502,691, Cl. 273-349.000.
Rauscher, Christen: *See—*
Taylor, Henry F.; Goldberg, Lew; Rauscher, Christen; and Weller, Joseph F., 4,503,403, Cl. 331-37.000.
Rave, Roderich, to Bayer Aktiengesellschaft. Cationic polyazo dyestuffs, their stable solutions, their preparation, and their use. 4,502,862, Cl. 8-437.000.
Raychem Corporation: *See—*
Duerig, Tom; and Melton, Keith, 4,502,896, Cl. 148-11.50F.
Stewart, Ray F.; Masia, Michael; and Macknick, Albert B., 4,502,929, Cl. 204-147.000.
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Fleischer, Niles A., 4,503,088, Cl. 427-58.000.
RCA Corporation: *See—*
Lewis, Henry G., Jr., 4,503,454, Cl. 358-13.000.
Lin, Peter T., 4,502,225, Cl. 33-18.00R.
Sauer, Donald J., 4,503,550, Cl. 377-63.000.
Schnable, George L.; and Wu, Chung P., 4,502,206, Cl. 29-576.00B.
Wedam, Werner F.; and Babcock, William E., 4,503,367, Cl. 315-371.000.
Wine, Charles M., 4,503,465, Cl. 358-195.100.
Realis Luc, Roberto: *See—*
Barbero, Aquilino; and Realis Luc, Roberto, 4,503,442, Cl. 346-140.00R.
Reardon, Dennis J. Portable locker. 4,502,576, Cl. 190-18.00R.
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Regie Nationale des Usines Renault: *See—*
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Regner, Hans: *See—*
Hofmann, Peter; Regner, Hans; Koppner, Manfred; and Zolffel, Michael, 4,502,992, Cl. 260-410.90R.
Reid, Paul I.; and Waters, Brian R., to English Clays Lovering Pochin & Co., Ltd. Stabilization of photochromic compounds, and the use of stabilized photochromic compounds. 4,503,177, Cl. 524-87.000.
Reilly, Laurence W., Jr., to USV Pharmaceutical Corporation. Process for the purification of N-morpholinoalkyl dihydropyridines. 4,503,223, Cl. 544-122.000.
Reim, Werner; and Garthe, Horst, to IWK Verpackungstechnik GmbH. Insert packaging device. 4,502,262, Cl. 53-157.000.
Reinecke, Paul: *See—*
Kramer, Wolfgang; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,503,059, Cl. 514-326.00A.
Reinhardt, Friedrich, to Hoechst Aktiengesellschaft. Pad-dyeing and printing synthetic fiber materials using disperse dye and carboxyl synthetic polymer and polysaccharide thickener combination. 4,502,867, Cl. 8-557.000.
Reisberg, Joseph: *See—*
Wellington, Scott L.; Reisberg, Joseph; Lutz, Eugene F.; and Bright, David B., 4,502,538, Cl. 166-252.000.
Reiser, Wolf: *See—*
Kramer, Wolfgang; Reiser, Wolf; Berg, Dieter; Brandes, Wilhelm; and Reinecke, Paul, 4,503,059, Cl. 514-326.00A.
Rempel, Garry L.; and Azizian, Hormoz, to Polysar Limited. Polymer hydrogenation process. 4,503,196, Cl. 525-338.000.
Rems-Werk Christian Foll und Sohne GmbH & Co.: *See—*
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Paddock, Gary V., 4,503,151, Cl. 435-68.000.
Reynolds, Joseph D., to Eaton Corporation. Variable mechanical advantage torque arm. 4,502,346, Cl. 74-339.000.
Rheinmetall GmbH.: *See—*
Metz, Josef; and Zielisnki, Erich, 4,502,366, Cl. 89-43.00R.
Rhone-Poulenc, Inc.: *See—*
Giacobbe, Thomas J.; Williams, Thomas N., Jr.; and Horn, James M., 4,503,245, Cl. 562-414.000.
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Desmurs, Jean, 4,503,239, Cl. 549-369.000.
Farge, Daniel; Roy, Pierre L.; Moutonnier, Claude; and Peyronel, Jean-Francois, 4,503,220, Cl. 544-16.000.
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Ribi ImmunoChem Research, Inc.: *See—*
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Richard, Christian, to Rhone-Poulenc Industries. Double or mixed silicates of alkali metal and other glass modifier metal(s) used to prepare glass compositions. 4,503,158, Cl. 501-27.000.
Richardson Chemical Company: *See—*
Baudrand, Donald W., 4,503,131, Cl. 428-672.000.
Richardson, Kenneth; and Cooper, Kelvin, to Pfizer Inc. N-Acyl 3-aryl-3-hydroxy-4-(1H-1,2,4-triazol-1-yl)-butyramide antifungal agents. 4,503,063, Cl. 514-383.000.
Riches, Kenneth M.: *See—*
Barlow, Peter L.; and Riches, Kenneth M., 4,503,176, Cl. 524-62.000.
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Ricoh Company, Ltd.: *See—*
Araki, Kunihio, 4,503,325, Cl. 250-204.000.
Kyomasu, Mikio; Araki, Toshiyuki; Fukunaga, Shinobu; and Shindo, Masahiro, 4,503,520, Cl. 365-177.000.
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Degironimo, Bruno; Silverman, Neil D.; Oliver, William R.; and Rideout, Eugene C., 4,502,488, Cl. 128-692.000.

Rieppel, Perry J.: *See*—
Coughlin, William J.; Rieppel, Perry J.; and Hoffman, Stephen A., 4,502,179, Cl. 15-322.000.

Ries, Donald G.: *See*—
Giddings, David M.; Ries, Donald G.; and Syrinek, Allen R., 4,502,964, Cl. 252-8.50C.
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Riker Laboratories, Inc.: *See*—
Wade, James J., 4,503,050, Cl. 514-222.000.

Ringot, Gabriel: *See*—
Beauducel, Claude; Cretin, Jacques; Ausset, Alain; and Ringot, Gabriel, 4,503,526, Cl. 367-20.000.

Riquin, Didier, to Lasag AG. Contact lens for the observation and treatment of a point in the eye. 4,502,764, Cl. 351-160.00R.

Rivers, Mark L.: *See*—
Brimhall, George H., Jr.; and Rivers, Mark L., 4,503,555, Cl. 382-6.000.

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RM Industrial Products Company, Inc.: *See*—
Zucker, Jerry; Hawkins, John W.; and O'Brien, John J., 4,502,364, Cl. 87-8.000.

Robert Bosch GmbH: *See*—
Damson, Eckard; Franke, Horst; Grob, Ferdinand; Moser, Winfried; and Muller, Klaus, 4,503,505, Cl. 364-431.080.
Dohse, Hans-Peter; and Wanner, Karl, 4,502,824, Cl. 409-234.000.
Esper, Friedrich J.; and Meudt, Gottfried, 4,503,348, Cl. 310-155.000.
Frank, Rudiger, 4,502,856, Cl. 418-137.000.
Fritz, Eberhard, 4,503,538, Cl. 371-28.000.
Gerber, Hans; Hidveghy, Ivan; Schaal, Gunter; Sturmer, Marian; Vogel, Eberhard; and Wessel, Claude, 4,503,425, Cl. 340-680.000.
Hafner, Udo; Hans, Waldemar; Krauss, Rudolf; and Sauer, Rudolf, 4,502,632, Cl. 239-125.000.
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Holfelder, Gerhard; and Muller, Klaus, 4,502,939, Cl. 204-429.000.
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Schnurle, Hans; Arnold, Herbert; and Horbelt, Michael, 4,502,447, Cl. 123-479.000.

Robertson, Gerald F.; and Pozniak, Donald J., to General Motors Corporation. Exhaust gas operated vacuum pump assembly. 4,502,848, Cl. 417-380.000.

Robertson, Gerald F.: *See*—
Pozniak, Donald J.; Robertson, Gerald F.; and McClain, Michael J., 4,502,847, Cl. 417-380.000.

Robeson, Lloyd M.; and Lynn, John W., to Union Carbide Corporation. Laminate compositions with polyarylate and poly(aryl ether). 4,503,121, Cl. 428-336.000.

Robins, Janis, to Minnesota Mining and Manufacturing Co. Epoxy resin curing agent, process and composition. 4,503,211, Cl. 528-92.000.

Robinson, Ivan M., to Indiana University Foundation. α,ω-Perfluorodicarboxylic acids. 4,503,206, Cl. 526-255.000.

Robson, Peter, to Procter & Gamble Company, The. Stain removal method using granular detergent composition comprising magnesium salt. 4,502,986, Cl. 252-526.000.

Robson, Robert, to Exxon Research & Engineering Co. Concentrates of lubricant additives. 4,502,971, Cl. 252-33.300.

Roca-Nierga, Manuel; and Lenzi, Giuliano, to Spica, S.p.A. Delivery regulator for a fuel injection pump. 4,502,445, Cl. 123-458.000.

Rocha, Emilio. Batting practice device for baseball. 4,502,684, Cl. 273-26.00E.

Roche, Joseph R.; and Morrill, Charles D., to Hydril Company. Flow diverter. 4,502,534, Cl. 166-84.000.

Rockmont Industries, Inc.: *See*—
Knobloch, Dale B., 4,502,859, Cl. 8-94.290.

Rockwell International Corporation: *See*—
Davidson, Donald J.; and Sheill, David D., 4,502,572, Cl. 188-72.800.
Fjeldsted, Thomas P.; and Hatheway, Alson E., 4,502,751, Cl. 350-6.400.
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McClellan, W. Roy, III; Girvin, Richard J.; and Conner, William A., 4,503,562, Cl. 455-22.000.
Yamamura, Michael M., 4,503,345, Cl. 307-605.000.

Rocquin, Camille J. Debris picker with interchangeable tips. 4,502,722, Cl. 294-61.000.

Rodnevsky, Leonid A.: *See*—
Fastritsky, Viktor S.; Vingris, Laimonis T.; Ardentov, Vasily V.; Florinsky, Jury B.; Plotnikov, Viktor I.; Rodnevsky, Leonid A.; and Alexeev, Gennady N., 4,503,392, Cl. 324-232.000.

Roesch, Egon: *See*—
Wiedemann, Fritz; Kampe, Wolfgang; Thiel, Max; Sponer, Gisbert; Roesch, Egon; and Dietmann, Karl, 4,503,067, Cl. 514-411.000.

Rogers, Alfred N.: *See*—
Awerbuch, Leon; and Rogers, Alfred N., 4,502,285, Cl. 60-641.500.

Rohm, Gunter H. Hydraulic power mandrel. 4,502,703, Cl. 279-2.00A.

Rolls-Royce Inc.: *See*—
Nightingale, Douglas J.; and Szuminski, Gary F., 4,502,636, Cl. 239-265.170.
Nightingale, Douglas J., 4,502,637, Cl. 239-265.170.
Szuminski, Gary F.; Nightingale, Douglas J.; and Tape, Robert F., 4,502,638, Cl. 239-265.290.
Szuminski, Gary F.; and Nightingale, Douglas J., 4,502,639, Cl. 239-265.310.

Rolls-Royce Limited: *See*—
Ballard, John R., 4,502,875, Cl. 55-306.000.
Pask, George, 4,502,276, Cl. 60-39.320.

Roman, Stephan. Blade pitch control in rotatable bladed devices for vehicles. 4,502,840, Cl. 416-114.000.

Romanov, Jury V.: *See*—
Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.

Romberger, John A.; and Meier, Daniel A., to Nalco Chemical Company. Method of improving inhibitor efficiency in hard waters. 4,502,978, Cl. 252-389.00A.

Rones, James M., to Land Industries. Polishing pad. 4,502,174, Cl. 15-98.000.

Rooney, Francis J.: *See*—
Rooney, William J.; and Rooney, Francis J., 4,503,415, Cl. 337-160.000.

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Roscher, Gunter: *See*—
Neu, Hermann; and Roscher, Gunter, 4,502,993, Cl. 260-415.000.

Rosenberger, Leonard S., to Kaydee Engineering, Inc. Heat transfer apparatus for transportable liquid containers. 4,502,392, Cl. 105-451.000.

Rosin, Michael L.: *See*—
O'Connor, James M.; Lickei, Donald L.; and Rosin, Michael L., 4,503,199, Cl. 525-455.000.

Roth, David W.: *See*—
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Roth, Myron A., Jr.: *See*—
DeVries, Henry L.; Roth, Myron A., Jr.; and Roth, William A., 4,502,741, Cl. 312-108.000.

Roth, Sydney J.: *See*—
Marino, Joseph A.; Kling, Michael J.; and Roth, Sydney J., 4,502,324, Cl. 73-117.300.

Roth, William A.: *See*—
DeVries, Henry L.; Roth, Myron A., Jr.; and Roth, William A., 4,502,741, Cl. 312-108.000.

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Nedelec, Lucien; Gasc, Jean-Claude; and Fauveau, Patrick, 4,503,053, Cl. 514-239.000.

Roy, Pierre L.: *See*—
Farge, Daniel; Roy, Pierre L.; Moutonnier, Claude; and Peyronel, Jean-Francois, 4,503,220, Cl. 544-16.000.

Royle, Stephen D., to Dana Corporation. Automatic cleaning and metering device. 4,502,510, Cl. 138-45.000.

Rub, Bernardo; and Weng, Lih J., to Digital Equipment Corporation. Arrangement for encoding and decoding information signals. 4,503,420, Cl. 340-347.0DD.

Rubbo, John T.; Burns, Kenneth R.; Heck, Ronald M.; and Early, John J., to Engelhard Corporation. Air-fuel ratio controller. 4,502,444, Cl. 123-440.000.

Rubinstein, Menachem: *See*—
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Rudolph, Volker: *See*—
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Ruhenstroth-Bauer, Gerhard: *See*—
Valet, Gunter; Ruhenstroth-Bauer, Gerhard; Wunsch, Erich; and Moroder, Luis, 4,503,148, Cl. 435-29.000.

Ruhrchemie Aktiengesellschaft: *See*—
Commer, Johann; Neuhaus, Wulf-Dieter; and Schmidt, Volkmar, 4,502,230, Cl. 34-57.00E.

Rule, Kenneth C.; and Michael, Frank W. Deep draft drilling platform. 4,502,551, Cl. 175-6.000.

Runyan, William S., to Iowa State University Research Foundation, Inc. Animal and bird restrainer. 4,502,418, Cl. 119-97.00R.

Ruperto, Winfred M. Jai-alai cesta. 4,502,690, Cl. 273-326.000.

Rushing, William C., to Berntsen, Inc. Driven-type sectionalized survey monument resistant to removal. 4,502,258, Cl. 52-103.000.

Russo, Carl J., to Varian Associates, Inc. Process for high temperature drive-in diffusion of dopants into semiconductor wafers. 4,503,087, Cl. 427-55.000.

Rutledge, David L.; and Fisher, Barbara J., to Harris Corporation. A.C. Testing of logic arrays. 4,503,387, Cl. 324-73.00R.

Ryan, John O., to Ampex Corporation. Apparatus and method for generating optimizing pictures under low light conditions. 4,503,466, Cl. 358-211.000.

Ryobi Limited: *See—*
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Sazaki, Kounin; and Murakami, Hideo, 4,502,645, Cl. 242-84.20G.

Ryu, Kazuo: *See—*
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S.N.E.C.M.A.: *See—*
d'Agostino, Guy; Dhainaut, Andre ; and Maillard, Claude M. J., 4,502,501, Cl. 137-487.000.
Girault, Daniel G., 4,502,274, Cl. 60-39.080.
Kebedjis, Georges, 4,502,841, Cl. 416-220.00R.

Saetre, Raymond L.; and Saetre, Robert S. Game cartridge display and carrier pack. 4,502,596, Cl. 206-387.000.

Saetre, Robert S.: *See—*
Saetre, Raymond L.; and Saetre, Robert S., 4,502,596, Cl. 206-387.000.

Safe-T-Frezz, Inc.: *See—*
Hare, Harold L.; and Bell, John M., 4,502,287, Cl. 62-126.000.

Saferstein, Albert; and Spector, Gilbert, to Comb Associates. Plastic nit comb. 4,502,498, Cl. 132-137.000.

St. Cyr, Paul L., to USM Corporation. Electronic component sensing system. 4,502,829, Cl. 414-730.000.

Saitoh, Koichi; Itami, Teruhiko; and Kimoto, Toshifumi, to Fuji Xerox Co., Ltd. Method of erasing magnetic latent image in thermo-magnetic recording. 4,503,438, Cl. 346-74.400.

Sakai, Kazuo: *See—*
Ikematsu, Masaki; Honzyo, Isao; and Sakai, Kazuo, 4,502,950, Cl. 208-309.000.

Sakai, Seiichi; Gange, Toshihiko; Tsukioka, Hideo; Sugawara, Katuo; Tani, Ichitaro; Mori, Etsunori; and Shiono, Shigeo, to Hitachi, Ltd.; and Shikoku Electric Power Company, Inc. Method and apparatus for diagnosing oil-filled electric apparatus. 4,502,320, Cl. 73-23.000.

Sakai, Yoshiki; Imaki, Katsuhiro; and Muryobayashi, Takashi, to Ono Pharmaceutical Co., Ltd. Use of prostaglandin analogues to treat cytodamage. 4,503,068, Cl. 514-412.000.

Sakamoto, Masafumi, to Japan Servo Co., Ltd. Permanent magnet type stepping motor. 4,503,368, Cl. 310-49.00R.

Sakano, Tetsuro, to Fanuc Ltd. Speed detection apparatus and method. 4,503,374, Cl. 318-616.000.

Sakurai, Hiroshi: *See—*
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Salice, Luciano, to Arturo Salice S.p.A. Connecting fixture. 4,502,807, Cl. 403-11.000.

Sanden Corporation: *See—*
Kimura, Shogo; and Takahashi, Haruo, 4,502,844, Cl. 417-275.000.

Sanders Associates, Inc.: *See—*
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Sandoz Ltd.: *See—*
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Fliri, Hans; and Hamberger, Helmut, 4,503,221, Cl. 544-27.000.
Loibner, Hans; Streicher, Wolfgang; and Stutz, Peter, 4,503,046, Cl. 514-40.000.
Stakelbeck, Hans-Peter, 4,503,191, Cl. 524-159.000.

Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The. Pneumatic tire having air retention innerliner. 4,502,520, Cl. 152-330.00R.

Sano, Shigenori, to Casio Computer Co., Ltd. Electronic musical instrument. 4,502,359, Cl. 84-1.190.

Sanymetal Products Co., Inc., The: *See—*
Clancy, Frank M., Jr., 4,502,183, Cl. 16-318.000.

Sarantitis, Anthony, to Palcon Corporation. Cart track. 4,502,628, Cl. 238-122.000.

Sardi, Stephen G.: *See—*
Gorgens, Joseph E.; Goff, Randall; and Sardi, Stephen G., 4,502,334, Cl. 73-705.000.

Sargent, Claud B., to Breston, Michael P., a part interest. Shears for cutting sheet metal. 4,502,222, Cl. 30-251.000.

Sasaki, Ichiro; Tsutsui, Yujiro; Inoue, Masaru; and Kase, Toru, to Nissan Motor Company, Limited; and Jidosha Denki Kogyo Kabushiki Kaisha. Automatic door locking/unlocking device for an automotive vehicle. 4,502,718, Cl. 292-336.300.

Sasaki, Kazuo: *See—*
Watase, Tosio; Mori, Koichi; Sasaki, Kazuo; Onizuka, Katsumi; Yoshikawa, Yuzo; and Fujita, Takeshi, 4,502,323, Cl. 73-49.600.

Sasaki, Takahisa. Method and device for the separation of suspended solids in waste water. 4,502,958, Cl. 210-695.000.

Sasib S.p.A.: *See—*
Zullo, Antonio, 4,502,261, Cl. 53-54.000.

Sato, Haruhito, to Idemitsu Kosan Company Limited. Zeolite-type catalyst and process for preparing same. 4,503,164, Cl. 502-202.000.

Sato, Mitsuo, to Aida Engineering Ltd. Press frame. 4,502,379, Cl. 100-214.000.

Sato, Noriaki: *See—*
Kamioka, Hajime; Takagi, Mikio; Sato, Noriaki; Nakano, Motoo; and Iwai, Takashi, 4,503,315, Cl. 219-121.0LE.

Sato, Shinsaku; and Yamagata, Ichiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Method of controlling operation of multistage hydraulic machines. 4,502,831, Cl. 415-1.000.

Sato, Takashi: *See—*
Okumura, Katsuya; Shinki, Toshinori; Sato, Takashi; and Ueda, Masaaki, 4,502,210, Cl. 29-591.000.

Satoh, Hiroshi: *See—*
Kakimi, Tsuneo; Nakanose, Megumi; Satoh, Hiroshi; Konishi, Takaharu; Kita, Hisanao; and Nakazaki, Takamitsu, 4,503,314, Cl. 219-121.0ED.

Sauer, Donald J., to RCA Corporation. Dynamic CCD input source pulse generating circuit. 4,503,550, Cl. 377-63.000.

Sauer, Rudolf: *See—*
Hafner, Udo; Hans, Waldemar; Krauss, Rudolf; and Sauer, Rudolf, 4,502,632, Cl. 239-125.000.

Sauer, Wolfgang; Halbritter, Klaus; and Engelbach, Heinz, to BASF Aktiengesellschaft. Preparation of glyoxal. 4,503,261, Cl. 568-471.000.

Saunders, Frank L.: *See—*
Leng, Douglas E.; Sigelko, Wilmer L.; and Saunders, Frank L., 4,502,888, Cl. 106-170.000.

Savage, Garry, to Institut de Recherche en Sante et en Securite du Travail du Quebec. Strap buckle. 4,502,191, Cl. 24-580.000.

Savin-Czeizler, Andrei; and Lang, Kenneth, to Bristol-Myers Company. Gripping device. 4,502,721, Cl. 294-1.100.

Sawada, Satoru, to Fuji Photo Film Co., Ltd. Image-forming process. 4,503,137, Cl. 430-203.000.

Saxon Arms, Inc.: *See—*
Morrison, David E., 4,502,612, Cl. 221-185.000.

Saxon, Daniel L, to Eastman Kodak Company. Variable capacity gasification burner. 4,502,633, Cl. 239-132.300.

Sazaki, Kounin; and Murakami, Hideo, to Ryobi Limited. Fishing spinning reels. 4,502,645, Cl. 242-84.20G.

Scales, John M.; and Wolcott, Bernard F., to Nicolon Corporation. Revetment panel methods. 4,502,815, Cl. 405-17.000.

Scammacca, Paul. Locking device for the outboard stern drive of a boat. 4,502,306, Cl. 70-159.000.

Scans Associates, Inc.: *See—*
Converse, Vernon G., III; Bordato, James M.; Bott, Theodore R.; Foerster, Charles E., Jr.; Miller, Robert E.; Mudge, Ronald K.; Pace, Aldren M.; and Van Allen, Kent, 4,502,318, Cl. 73-3.000.

Scapa-Porritt Limited: *See—*
Wheeldon, John B., 4,502,595, Cl. 198-853.000.

Schaal, Gunter: *See—*
Gerber, Hans; Hidveghy, Ivan; Schaal, Gunter; Sturmer, Marian; Vogel, Eberhard; and Wessel, Claude, 4,503,425, Cl. 340-680.000.

Schacht, Dieter. Pull-off aid for drawing threads from bobbins. 4,502,644, Cl. 242-129.800.

Schachter, Friedrich. Shaving instrument. 4,502,217, Cl. 30-82.000.

Schadlich, Fritz: *See—*
Hornung, Friedrich; Jundt, Wolfgang; Schadlich, Fritz; Vogt, Hans-Joachim; and Wunsch, Steffen, 4,502,549, Cl. 173-12.000.

Schaefer, Helmut; and Schaefer, Philipp, to Secans AG. Synthetic-resin body support material. 4,502,234, Cl. 36-28.000.

Schaefer Marine, Inc.: *See—*
Merry, Carl A., 4,502,406, Cl. 114-204.000.

Schaefer, Philipp: *See—*
Schaefer, Helmut; and Schaefer, Philipp, 4,502,234, Cl. 36-28.000.

Schaeff, Hans, to Karl Schaeff GmbH & Co. Articulated loader with transversely displaceable counterweight. 4,502,709, Cl. 280-758.000.

Schatz, Klaus W.: *See—*
Haddad, James H.; Owen, Hartley; and Schatz, Klaus W., 4,502,947, Cl. 208-161.000.

Schauffele, Carl N.: *See—*
Brooks, Edward J.; and Schauffele, Carl N., 4,503,508, Cl. 364-525.000.

Schaupp, Richard E., to Racor Industries, Inc. Filter assembly. 4,502,955, Cl. 210-149.000.

Scheidenhelm, Earl L.: *See—*
Jones, Dennis J.; Scheidenhelm, Earl L.; and Truckenbrod, Thomas G., 4,502,493, Cl. 130-24.000.

Schemmann, Hugo: *See—*
Bertram, Leo; and Schemmann, Hugo, 4,503,346, Cl. 310-49.00R.

Schepis, Dominic J.: *See—*
Lechaton, John S.; Malaviya, Shashi D.; Schepis, Dominic J.; and Srinivasan, Gurumakonda R., 4,502,913, Cl. 156-643.000.

Schering Aktiengesellschaft: *See—*
Biere, Helmut; Rufer, Clemens; and Boettcher, Irmgard, 4,503,049, Cl. 514-80.000.

Schering Corporation: *See—*
Girijavallabhan, Viyyoor M.; Ganguly, Ashit K.; Pinto, Patrick A.; and Versace, Richard W., 4,503,064, Cl. 514-210.000.

Scherl, Wolfgang; Abele, Ludwig; and Wahl, Friedrich. Method for automatic recognition of white blocks as well as text, graphics and/or gray image areas on a printed master. 4,503,556, Cl. 382-9.000.

Scherrinsky, Elmer D. Pole-mounted bait and trap attachment. 4,502,242, Cl. 43-96.000.

Schetelich, Alan A.; Tunkel, Norman; and Brownawell, Darrell W., to Exxon Research & Engineering Co. Lubricating oil composition. 4,502,970, Cl. 252-32.70E.

Scheyrer, Peter: *See—*
Breuninger, Axel; Pollmann, Richard; and Scheyrer, Peter, 4,503,094, Cl. 427-250.000.

Schick, Jerome D.; and Wilson, Howard R., to International Business Machines Corporation. Non-volatile memory and switching device. 4,503,521, Cl. 365-182.000.

Schiller, August: *See—*
Von Au, Gunter; Wegehaupt, Karl-Heinrich; Schiller, August; and Braunsperger, Karl, 4,503,210, Cl. 528-33.000.

Schimko, Reinhold; Radl, Franz; and Fuchs, Max, to Universal Maschinenfabrik Dr. Rudolf Schieber GmbH & Co. KG. Tension adjusting device for flat knitting machines. 4,502,300, Cl. 66-71.000.

Schimmel, Gunther; Krause, Werner; and Gradl, Reinhard, to Hoechst Aktiengesellschaft. Process for extracting heavy metal ions from aqueous solutions. 4,503,016, Cl. 423-24.000.

Schleppinghoff, Bernhard; and Becker, Martin, to EC Erdolchemie GmbH. Process for the production of methyl tert.-butyl ether (MTBE) and of hydrocarbon raffinates substantially freed from i-butene and from methanol. 4,503,265, Cl. 568-697.000.

Schlumberger Electronics (UK) Limited: *See*—
Smith, Kenneth B.; and Adams, Derek W., 4,502,793, Cl. 374-124.000.

Schlumberger, Helmut: *See*—
Deeg, Rolf; Schlumberger, Helmut; and Ziegenhorn, Joachim, 4,503,144, Cl. 435-11.000.

Schmid, Josef: *See*—
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Schmid, Manfred: *See*—
Klebe, Hans; Koth, Detlev; Kerner, Dieter; Schmid, Josef; and Schmid, Manfred, 4,503,092, Cl. 427-213.000.

Schmid, Werner: *See*—
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Schmidt, Volkmar: *See*—
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Schmitt, Frederick L.: *See*—
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,503,259, Cl. 568-382.000.

Schnable, George L.; and Wu, Chung P., to RCA Corporation. Method of forming semiconductor contacts by implanting ions of neutral species at the interfacial region. 4,502,206, Cl. 29-576.00B.

Schneider, Claus: *See*—
Walther, Gerhard; Schneider, Claus; Weber, Karl-Heinz; and Fugner, Armin, 4,503,060, Cl. 514-214.000.

Schnurle, Hans; Arnold, Herbert; and Horbelt, Michael, to Robert Bosch GmbH. Method of and device for supervising electrical fuel injection systems. 4,502,447, Cl. 123-479.000.

Schoepe, George P.: *See*—
Hashiguchi, Don H.; Dietrich, Ronald J.; and Schoepe, George P., 4,503,165, Cl. 502-225.000.

Schreder, Felix, to E.G.O. Elektro-Gerate Blanc und Fischer. Control device for an electric hotplate. 4,503,321, Cl. 219-449.000.

Schreiber, Alfons: *See*—
Patzold, Dieter; Schreiber, Alfons; and Tiwi, Peter, 4,502,173, Cl. 15-41.00R.

Schreiber, Paul T., to Tandy Corporation. Computer graphics generator. 4,503,429, Cl. 340-799.000.

Schreinemacher, Herbert: *See*—
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Schroeder, Albert H.: *See*—
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Schuhmann, Siegfried: *See*—
Cappel, Bert; Kerber, Helmut; Schuhmann, Siegfried; and Steiner, Gerd, 4,502,386, Cl. 101-350.000.

Schuliers, Wolfgang: *See*—
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Schultz, Frederick K., to General Motors Corporation. AM Stereo pilot signal detection circuitry. 4,503,397, Cl. 328-138.000.

Schultz, Robert H., to Adolph Coors Company. Device and method for uniformly curing uv photoreactive overvarnish layers. 4,503,086, Cl. 427-54.100.

Schuren, Gerardus W.: *See*—
Hemels, Martinus H.; and Schuren, Gerardus W., 4,503,115, Cl. 428-281.000.

Schuster, Norman J.: *See*—
Husted, Martin D.; and Schuster, Norman J., 4,502,601, Cl. 211-41.000.

Schutte, Valentin H.: *See*—
Kommoss, Klaus; and Schutte, Valentin H., 4,503,476, Cl. 360-137.000.

Schutz, Hans-Ulrich: *See*—
Back, Gerhard; Beffa, Fabio; and Schutz, Hans-Ulrich, 4,502,865, Cl. 8-543.000.

Schwarzkopff, Udo; and Fischer, Horst, to Akzona Incorporated. Floor covering for stables. 4,502,415, Cl. 119-28.000.

Schwarzmann, Matthias: *See*—
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Schwenke, Dieter: *See*—
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Schwenzer, Alfred F.: *See*—
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SCM Corporation: *See*—
Hashiguchi, Don H.; Dietrich, Ronald J.; and Schoepe, George P., 4,503,165, Cl. 502-225.000.
Martino, Phillip C.; and Winner, Peter P., 4,503,173, Cl. 523-407.000.

Scofield, Robert L.: *See*—
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Scotfoam Corporation: *See*—
Triolo, Rocco P., 4,503,150, Cl. 435-41.000.

Scrivener, Stephen P.; Smith, Wallace D.; Mansell, Mark L.; and Campbell, Neville D., to Commissioner for Main Roads, The. Road testing apparatus. 4,502,327, Cl. 73-146.000.

Seaman, A. Matthew, to Cutters Exchange, Inc. Belt loop sewing apparatus. 4,502,399, Cl. 112-121.270.

Searle, Robert F., to Vibrac Corporation. Fiber optic optical device. 4,503,326, Cl. 250-227.000.

Secans AG: *See*—
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Sedlmeier, Werner: *See*—
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Seisakusho Kabushiki Kaisha Toyoda Jidoshokki: *See*—
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Seki, Kunio; and Takeshita, Ritsuji, to Hitachi, Ltd. Transistor power amplifier circuit. 4,503,478, Cl. 361-79.000.

Sekiguchi, Kanetaka: *See*—
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Senga, Takao; Suzuki, Shigeyoshi; Yamada, Jun; and Kuriu, Sadao, to Mitsubishi Paper Mills, Ltd.; and Dainippon Screen Mfg., Co., Ltd. Method for feeding recording sheet materials. 4,502,677, Cl. 271-104.000.

Senger, Eugene J.: *See*—
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Sereda, Viktor G.: *See*—
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Serinken, Nur M.; Calder, Iain D.; Gale, James; and Fletcher, Norman C., to Northern Telecom Limited. Interactive viewgraph system. 4,503,468, Cl. 358-256.000.

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Yong, Raymond N.; and Sethi, Amar J., 4,502,961, Cl. 210-728.000.

Seto, John Y. W.; and Su, Ken K. Y., to Fairchild Camera & Instrument Corporation. Method of fabricating polycrystalline silicon resistors in integrated circuit structures using outdiffusion. 4,502,894, Cl. 148-1.500.

Seto, Tadao; and Shimazaki, Yoshikazu, to Fuji Kagakushi Kogyo Co., Ltd. Heat-sensitive color transfer recording media. 4,503,095, Cl. 427-265.000.

Setterberg, John R., Jr., to Otis Engineering Corporation. Submersible pump. 4,502,536, Cl. 166-105.500.

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Setzer, Herbert J., to United Technologies Corporation. Steam reforming utilizing high activity catalyst. 4,503,029, Cl. 423-652.000.

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Shah, Ashwin H., to Texas Instruments Incorporated. Power-down inverter circuit. 4,503,341, Cl. 307-450.000.

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Sharp Kabushiki Kaisha: *See*—
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Shaw, Ricky L., to Conoco Inc. Self-elevating acute turn guide hose hauler vehicle. 4,502,390, Cl. 104-245.000.

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Bright, Edward J.; Kandybowski, Steven J.; Sheesley, Wilmer L.; and Sinisi, David B., 4,502,747, Cl. 339-75.00M.

Shefford, Roger A., to Koninklijke Emballage Industrie Van Leer B.V. Enclosure member consisting essentially of solid, non-aromatic polymers. 4,503,103, Cl. 428-35.000.

Sheill, David D.: *See*—
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Sheldon, Samuel B.; Leach, Jack L.; and Harkness, Scott A., to Nepsco, Inc. Portable seat and back rest. 4,502,728, Cl. 297-284.000.

Shell, Francis J., to Phillips Petroleum Company. Workover and completion fluids. 4,502,969, Cl. 252-8.55R.

Shell Oil Company: *See*—
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Singleton, David M., 4,503,280, Cl. 585-527.000.
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Shelton, Edward B.; Hayes, Richmond S., Jr.; and Kozlowski, Robert M., to Carrier Corporation. Combination fan motor and orifice support assembly. 4,502,291, Cl. 62-285.000.
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Shields, William A., to General Motors Corporation. Vented fuel tank filler. 4,502,516, Cl. 141-290.000.
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Shupert, Paul T., to Allis-Chalmers Corporation. Crop divider with illuminated points. 4,502,270, Cl. 56-314.000.
Siahou, Joseph. Toothbrush for polarizing the active ingredients of toothpaste. 4,502,497, Cl. 132-84.00R.
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Humbs, Rolf, 4,502,805, Cl. 400-647.100.
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Societe Anonyme Francaise Du Ferodo: *See*—
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Sprague, Peter W.; and Heikes, James E., to E. R. Squibb & Sons, Inc. 7-Oxabicycloheptane prostaglandin intermediates. 4,503,241, Cl. 549-459.000.

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Brodie, Ivor; and Thackray, Malcolm, 4,503,551, Cl. 378-28.000.
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Srinivasan, Gurumakonda R.: *See*—
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Staiger, Gerhard; and Macri, Antonio, to Consortium Fur Elektrochemische Industrie GmbH. Process for preparing 8,12-epoxy-13,14,15,16-tetranorlabdane. 4,503,240, Cl. 549-458.000.

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Stalzer, Kurt, to Telefonbau und Normalzeit GmbH. Spool for transformer in power supply device. 4,503,413, Cl. 336-192.000.

Standard Oil Company (Indiana): *See*—
Grasselli, Robert K.; Miller, Arthur F.; and Hardman, Harley F., 4,503,001, Cl. 260-465.300.
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Stangeland, Kjell-Egil, to Kverneland A/S. Plow assembly with turn limiter. 4,502,544, Cl. 172-283.000.
Stangl, Kurt, to Voest-Alpine Aktiengesellschaft. Apparatus for a controlled supply of powder to a mold for continuous casting. 4,502,615, Cl. 222-199.000.
Stangroom, James E., to National Research Development Corporation. Electroviscous fluids. 4,502,973, Cl. 252-73.000.
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Starr, Maurice, to American Monitor Corporation. Reagent dispensing system. 4,503,012, Cl. 422-100.000.
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Stecker, Earl M.; and Plamann, Richard C., to Stoelting, Inc. Flavor decanter and pump. 4,502,617, Cl. 222-385.000.
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Stephenson, Ronald L.; and Beer, Arthur G., to General Motors Corporation. Collet-containing mold for undercut molding. 4,502,659, Cl. 249-66.00R.
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Stewart, Charles W., to Du Pont de Nemours, E. I., and Company. Graphite reinforced perfluoroelastomer. 4,503,171, Cl. 523-215.000.
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Stewart, Ray F.; Masia, Michael; and Macknick, Albert B., to Raychem Corporation. Corrosion protection method. 4,502,929, Cl. 204-147.000.
Stewen, Wilhelm; and Pape, Peter. Coke oven chamber door. 4,502,922, Cl. 202-248.000.
Sticht, Walter. Workpiece carrier locating and clamping mechanism for assembly line arrangement. 4,502,585, Cl. 198-345.000.
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Stinton, Robert T.: *See*—
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Stobb, Walter J., to Stobb, Inc. Automated sheet-moving system. 4,502,828, Cl. 414-226.000.
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Stokes, Gilbert A. Ball feeder for throwing machine. 4,502,455, Cl. 124-50.000.
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Struthers, Ralph C. Fuel cell electrode. 4,503,132, Cl. 429-40.000.
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Yong, Raymond N.; and Sethi, Amar J., 4,502,961, Cl. 210-728.000.
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Suzuki, Kohji; Yoo, Hideo; and Takamiya, Yoshio, to Ricoh Company, Ltd. Photoconductor cleaning apparatus. 4,502,780, Cl. 355-15.000.

Suzuki, Misao: *See*—
Tomozaki, Ryozo; Uchita, Takeshi; Ide, Hideo; and Suzuki, Misao, 4,502,532, Cl. 165-79.000.
Suzuki, Ryoichi; and Tokuda, Ryuji, to Canon Kabushiki Kaisha. Battery check device for camera. 4,502,774, Cl. 354-403.000.
Suzuki, Shigeto: *See*—
Denisevich, Peter, Jr.; Suzuki, Shigeto; Kurkov, Victor P.; and Schroeder, Albert H., 4,502,980, Cl. 252-500.000.
Suzuki, Shigeyasu: *See*—
Suzuki, Akio; Akiyama, Mitsuo; Kashiwazaki, Susumu; Suzuki, Shigeyasu; Tominaga, Yasunori; and Arakawa, Michihisa, 4,502,290, Cl. 62-229.000.
Suzuki, Shigeyoshi: *See*—
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Suzuki, Soubei: *See*—
Nishizawa, Junichi; Suzuki, Soubei; and Tamamushi, Takashige, 4,502,203, Cl. 29-571.000.
Suzuki, Tadashi; and Kishi, Norimasa, to Nissan Motor Company, Limited. Hydraulic pressure control system for automatic transmission. 4,502,354, Cl. 74-866.000.
Suzuki, Yasuo, to Omron Tateisi Electronic Co. Transaction processing apparatus for storing and/or calculating costs, sales, deductions, number of sales, cost multiplier, and profit, in a departmentalized format. 4,503,503, Cl. 364-405.000.
Suzumura, Nobuyasu; Umebayashi, Kazuyuki; and Yamada, Takahiro, to Aisin Seiki Kabushiki Kaisha. Attitude controlling device for a steering wheel. 4,503,504, Cl. 364-425.000.
Svab, Eugen, to Ford Motor Company. Infinitely variable transmission for a vehicle. 4,502,352, Cl. 74-689.000.
Swallow, Roger T.; Jackson, William R.; and Pierce, Jack D., to Rampon Products, Inc. Support stocking product or the like. 4,502,301, Cl. 66-178.00A.
Swanson, Russell K. Display fixture with removable arm for use with perforated board. 4,502,602, Cl. 211-59.100.
Swanson, Wesley S., to Eaton Corporation. Electrically actuated valve assembly. 4,502,661, Cl. 251-30.000.
Swearingen, Judson S. Method for nozzle clamping force control. 4,502,836, Cl. 415-150.000.
Sykes, Huey P.; and Brainard, Richard H. Current interrupting lightning arrester isolator. 4,503,414, Cl. 337-31.000.
Sykes, Richard B.; and Parker, William L., to E. R. Squibb & Sons, Inc. Antibiotic cepacin. 4,503,218, Cl. 549-320.000.
Sylvester, Mark W.: *See*—
Ares, Roland A.; and Sylvester, Mark W., 4,502,292, Cl. 62-238.600.
Synthelabo: *See*—
Bertin, Jean; and Frost, Jonathan R., 4,503,058, Cl. 514-214.000.
SyQuest Technology: *See*—
Nigam, Anil, 4,503,474, Cl. 360-133.000.
Syrinek, Allen R.: *See*—
Giddings, David M.; Ries, Donald G.; and Syrinek, Allen R., 4,502,964, Cl. 252-8.50C.
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Szabolcs, Otto, to Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft. Condensation process. 4,503,266, Cl. 568-719.000.
Szajna, John L., to Continental Plastic Containers, Inc. Bulge resistant bottle bottom. 4,502,607, Cl. 220-70.000.
Szemeredi, Robert S.; Tarnay, Matthew G.; and Lee, Kenneth, to Price Pfister, Inc. Washer and nut combination for locking plumbing fixtures to a sink deck or the like. 4,502,165, Cl. 4-192.000.
Szijjarto , Emilia; and Raskai, Magda, to Human Oltoanyagtermelo es Kutato Intezet. Composition for the treatment of epithelial injuries and process for the preparation thereof. 4,503,037, Cl. 424-94.000.
Szuminski, Gary F.; Nightingale, Douglas J.; and Tape, Robert F., to Rolls-Royce Inc. Turbomachine ejector nozzle and thrust reverser. 4,502,638, Cl. 239-265.290.
Szuminski, Gary F.; and Nightingale, Douglas J., to Rolls-Royce Inc. Turbomachine ejector nozzle. 4,502,639, Cl. 239-265.310.
Szuminski, Gary F.: *See*—
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Taarning, Claus E.: *See*—
Henriksen, Henrik; Nielsen, Torben G.; and Taarning, Claus E., 4,503,477, Cl. 361-2.000.
Tabler, Donald C., to Phillips Petroleum Company. Reclaiming used lubricating oil. 4,502,948, Cl. 208-183.000.
Tabler, Donald C.: *See*—
Nowack, Gerhard P.; Johnson, Marvin M.; and Tabler, Donald C., 4,503,249, Cl. 564-385.000.
Tacklind, Christopher A., to Hewlett-Packard Company. Method and apparatus for generating a gray scale with a high speed thermal ink jet printer. 4,503,444, Cl. 346-140.00R.
Tadokoro, Tomoo; and Akagi, Toshimichi, to Mazda Motor Corporation. Intake system for multiple cylinder internal combustion engine. 4,502,435, Cl. 123-198.00F.
Tajiri, Yoshinobu: *See*—
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Takada, Juichiro, to Takata Kogyo Co., Ltd. Lockable moving belt anchor for passive vehicle occupant restraint belt systems. 4,502,710, Cl. 280-804.000.
Takagi, Mikio: *See*—
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Takahashi, Haruo: *See*—
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Takahashi, Hiroshi; and Goto, Teruhisa, to Mitsubishi Petrochemical Company Limited. Process for preparing heat-resistant resins. 4,503,194, Cl. 525-329.500.
Takahashi, Kazuo, to Canon Kabushiki Kaisha. Semiconductor printing apparatus with multiple independent temperature control. 4,503,335, Cl. 250-548.000.
Takahashi, Noriyoshi: *See*—
Kitabayashi, Yukio; Takahashi, Noriyoshi; Watanabe, Masatoshi; Okuyama, Toshiaki; and Tanaka, Yoji, 4,503,377, Cl. 318-807.000.
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Takakuwa, Eiji; Shimizu, Kouichi; and Kondo, Masahiro, to Nippondenso Co., Ltd. Optimum ignition and A/F control for internal-combustion engine. 4,502,442, Cl. 123-417.000.
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Takei, Humihiko: *See*—
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Takematsu, Tetsuo; Kikkawa, Nobuyuki; and Ogawa, Hideaki, to Idemitsu Kosan Company Limited. N-(α,α-dialkylbenzyl)-phenylacetamide compounds and herbicidal compositions containing said compounds. 4,502,883, Cl. 71-118.000.
Takemoto Yushi Kabushiki Kaisha: *See*—
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Takenouchi, Tomoo: *See*—
Iwanami, Yoshiyuki; Taniguchi, Kozo; Funazaki, Mitsunori; and Takenouchi, Tomoo, 4,502,524, Cl. 164-66.100.
Takeshima, Sadao: *See*—
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Takeshita, Ritsuji: *See*—
Seki, Kunio; and Takeshita, Ritsuji, 4,503,478, Cl. 361-79.000.
Takeuchi, Naoki: *See*—
Murase, Kazuo; Watanabe, Toshihiko; Takeuchi, Naoki; and Maruyama, Tokuji, 4,503,316, Cl. 219-130.320.
Takiguchi, Michitaka: *See*—
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Takizawa, Syoichi: *See*—
Morita, Masahiko; Mano, Junichi; Nishida, Minoru; Tanaka, Tomoo; Aoyagi, Nobuo; and Takizawa, Syoichi, 4,502,897, Cl. 148-12.00F.
Talley, John J., to General Electric Company. Method of producing 2,3,6 trimethylphenol. 4,503,270, Cl. 568-783.000.
Tamamushi, Takashige: *See*—
Nishizawa, Junichi; Suzuki, Soubei; and Tamamushi, Takashige, 4,502,203, Cl. 29-571.000.
Tamukai, Tadao, to Alps Electric Co., Ltd. Method of initializing pen recorder carriage position. 4,503,441, Cl. 346-139.00R.
Tanaka, Masaru, to Horiba, Ltd. Analyzer compensation circuit. 4,502,784, Cl. 356-222.000.
Tanaka, Masato: *See*—
Kobayashi, Toshiaki; and Tanaka, Masato, 4,503,232, Cl. 546-336.000.
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Schreiber, Paul T., 4,503,429, Cl. 340-799.000.
Tang, Kuo-Chang; and Berkowitz, Phillip T., to Olin Corporation. Process for trimerizing organic polyisocyanates. 4,503,226, Cl. 544-193.000.
Tani, Hoshiro: *See*—
Minami, Kenji; Kawata, Yoshimasa; Ushio, Tetsuji; Tani, Hoshiro; and Mitani, Kazuhisa, 4,502,924, Cl. 204-16.000.
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Sakai, Seiichi; Gange, Toshihiko; Tsukioka, Hideo; Sugawara, Katuo; Tani, Ichitaro; Mori, Etsunori; and Shiono, Shigeo, 4,502,320, Cl. 73-23.000.
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Iwanami, Yoshiyuki; Taniguchi, Kozo; Funazaki, Mitsunori; and Takenouchi, Tomoo, 4,502,524, Cl. 164-66.100.
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Tape, Robert F.: *See*—
Szuminski, Gary F.; Nightingale, Douglas J.; and Tape, Robert F., 4,502,638, Cl. 239-265.290.
Taplin, Lael B., to Vickers, Incorporated. Power transmission. 4,502,708, Cl. 280-755.000.
Tar, Sandor: *See*—
Banfi, Andras; Leibinger, Janos; Molnar, Laszlo ; Nadori nee Kozel, Gizella; and Tar, Sandor, 4,503,047, Cl. 424-195.100.
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Okada, Kunio; Takeshima, Sadao; and Tashiro, Shuichirow, 4,502,504, Cl. 137-544.000.
Tavazza, Giuseppe; and Boiocchi, Maurizio, to Societa Pneumatici Pirelli S.p.A. Mounting-rim for tires and its assembly with corresponding tire. 4,502,521, Cl. 152-381.400.
Taylor, Henry F.; Goldberg, Lew; Rauscher, Christen; and Weller, Joseph F., to United States of America, Navy. Optical injection locking of solid-state oscillators by frequency-multiplexed injection-locked, laser diodes. 4,503,403, Cl. 331-37.000.
TDeutsche Forschungs-und Versuchsanstalt fur Luft-und Raumfahrt e.V. Linder Hohe: *See*—
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Technicare Corporation: *See*—
Kovacs, Richard M., Jr.; Senger, Eugene J.; and Wake, Robert H., 4,503,331, Cl. 250-363.00S.
Technicon Instruments Corporation: *See*—
Yun, Shyun-long; Leon, Luis P.; and Ahmad, Syed I., 4,503,146, Cl. 435-19.000.
Tektronix, Inc.: *See*—
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Telecommunications Radioelectriques T.R.T.: *See*—
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Telefonbau und Normalzeit GmbH: *See*—
Stalzer, Kurt, 4,503,413, Cl. 336-192.000.
Teller, Aaron J., to Teller Environmental Systems, Inc. Control of dioxin emissions from incineration. 4,502,396, Cl. 110-346.000.
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Moyer, Mark C.; Petersen, Clifford W.; Kusenberger, Felix N.; Perry, William D.; Balter, Floyd A.; and Teller, Cecil M., II, 4,503,393, Cl. 324-235.000.
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Tenud, Leander: *See*—
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Tero, Brian A., to Lintvalve Electronic Systems Limited. Apparatus for detecting leaks in steam raising boilers. 4,502,322, Cl. 73-40.50A.
Teshima, Tsunehiko: *See*—
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Alexander, David C.; Knifton, John F.; and Unvert, Susan D., 4,503,217, Cl. 528-392.000.
Jahnke, Frederick C.; Crouch, William B.; and Gulko, George M., 4,502,869, Cl. 48-197.00R.
Speranza, George P.; and Grigsby, Robert A., Jr., 4,503,197, Cl. 525-437.000.
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Texas Instruments Incorporated: *See*—
Carter, Duane E.; and Jucha, Rhett B., 4,502,915, Cl. 156-643.000.
Dyer, Lawrence D., 4,502,459, Cl. 125-13.00R.
Hamilton, Stephen P.; and McFarland, Harry G., 4,503,494, Cl. 364-200.000.
Magar, Surendar S., 4,503,500, Cl. 364-200.000.
Malhi, Satwinder, 4,502,202, Cl. 29-571.000.
McElroy, David J., 4,503,524, Cl. 365-218.000.
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Vandierendonck, Jerry L., 4,503,511, Cl. 364-716.000.
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Thanawala, Hemesh L., to Associated Electrical Industries Limited. Static reactive compensator. 4,503,380, Cl. 323-206.000.
Thatcher, Richard E. Paper dispensing apparatus. 4,502,621, Cl. 225-16.000.
Theeuwes, Felix: *See*—
Edgren, David; Wong, Patrick S. L.; and Theeuwes, Felix, 4,503,030, Cl. 424-15.000.
Theurer, Josef; and Brunninger, Manfred, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Track work train. 4,502,389, Cl. 104-2.000.
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Thomas, Cornelia; and Wingert, Rachel T. Hair curling device. 4,502,496, Cl. 132-40.000.
Thomas, Glenn R.: *See*—
Mrenna, Stephen A.; Thomas, Glenn R.; and Haugh, Charles E., 4,503,408, Cl. 335-35.000.
Thomas, John F., Jr.; and Morgan, Cleon C., to Donnelly Corporation. Sliding vent window. 4,502,248, Cl. 49-374.000.
Thomas, Robert J.: *See*—
Anderson, Alfred J.; and Thomas, Robert J., 4,502,200, Cl. 29-526.00R.
Thompson, John S., to AT&T Bell Laboratories. Distributed timing system. 4,503,490, Cl. 364-200.000.
Thomsen, Svend E.: *See*—
Petersen, Hans C.; and Thomsen, Svend E., 4,502,855, Cl. 418-15.000.
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Thurman, Robert L.; and Williamson, Jimmie R., Jr., to Otis Engineering Corporation. Well system. 4,502,542, Cl. 166-325.000.
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Tiwi, Peter: *See*—
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Tobagi, Fouad A.; Fratta, Luigi; and Borgonovo, Flaminio, to Stanford University. Local area communication network utilizing a round robin access scheme with improved channel utilization. 4,503,533, Cl. 370-85.000.
Toda, Tsuneo: *See*—
Matsumoto, Hiroshi; Nawata, Yoshiaki; and Toda, Tsuneo, 4,502,776, Cl. 355-14.0SH.
Todd, Dale, to Bert Moore Sales, Inc. Hopper cover. 4,502,610, Cl. 220-346.000.
Togashi, Seigo; and Sekiguchi, Kanetaka, to Citizen Watch Company Limited. Method of manufacturing insulated gate thin film field effect transistors. 4,502,204, Cl. 29-571.000.
Tokuda, Kuniaki: *See*—
Yamazato, Fujio; Tokuda, Kuniaki; and Oda, Toshihiko, 4,503,156, Cl. 436-79.000.
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Horie, Hiromichi; Shimotori, Kazumi; and Murabayashi, Hideki, 4,502,982, Cl. 252-513.000.
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Mori, Leo; Aoba, Takashi; and Tominaga, Mamoru, 4,502,755, Cl. 350-128.000.
Ogura, Masahiko, 4,503,407, Cl. 355-14.00C.
Ohuchi, Kazunori, 4,503,343, Cl. 307-482.000.
Okumura, Katsuya; Shinki, Toshinori; Sato, Takashi; and Ueda, Masaaki, 4,502,210, Cl. 29-591.000.
Sato, Shinsaku; and Yamagata, Ichiro, 4,502,831, Cl. 415-1.000.
Yamagata, Ichiro, 4,502,835, Cl. 415-104.000.
Yokota, Tsuneshi, 4,503,324, Cl. 250-201.000.

Toledo-Pereyra, Luis H., to Mount Carmel Research and Education Corporation. Organ hypothermic storage unit. 4,502,295, Cl. 62-463.000.

Tomasi, Jean P., to U.S. Philips Corporation. Range measurement by means of frequency modulated continuous wave radar. 4,503,433, Cl. 343-7.500.

Tomesko, Charles L., to Automated Optics, Inc. Method and apparatus for adhering a workpiece to a support block. 4,502,909, Cl. 156-356.000.

Tominaga, Mamoru: *See*—
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Tominaga, Yasunori: *See*—
Suzuki, Akio; Akiyama, Mitsuo; Kashiwazaki, Susumu; Suzuki, Shigeyasu; Tominaga, Yasunori; and Arakawa, Michihisa, 4,502,290, Cl. 62-229.000.

Tomioka, Shigeo, to Minnesota Mining and Manufacturing Company. Plastic core for an elastically shrinkable tubular cover. 4,503,105, Cl. 428-36.000.

Tomozaki, Ryozo; Uchita, Takeshi; Ide, Hideo; and Suzuki, Misao, to Hitachi, Ltd. Fin-and-tube type heat exchanger. 4,502,532, Cl. 165-79.000.

Tonal S.a.S. di Furnari Giuseppe & C.: *See*—
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Toshiba Shibaura Denki Kabushiki Kaisha: *See*—
Ohshima, Jiro; Abe, Masahiro; and Koshino, Yutaka, 4,502,207, Cl. 29-576.00B.

Toshiba Silicone Co., Ltd.: *See*—
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Toska Co., Ltd.: *See*—
Kato, Masami, 4,503,006, Cl. 264-148.000.

Tourillon, Gerard: *See*—
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Towers, James A.: *See*—
Chang, Franklin S.; and Towers, James A., 4,503,099, Cl. 428-425.800.

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Toyo Tanso Co., Ltd.: *See*—
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Unno, Kunihiko; Tsujiuchi, Toshio; and Oda, Yukio, 4,502,458, Cl. 125-11.00R.

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Kakuda, Yosiro, 4,503,487, Cl. 362-80.000.
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Okumura, Takeshi; Nakanishi, Kiyoshi; and Inoue, Tokuta, 4,502,432, Cl. 123-188.00M.

Traction Research, Inc.: *See*—
Johnson, Neil M., 4,502,736, Cl. 305-9.000.

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Maddox, James P.; Jolley, Jack, Jr.; Drobnick, Louis W.; and Amend, William E., 4,502,839, Cl. 415-202.000.

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Antonov, Lyubomir Y.; Trenev, Alexander M.; Angelov, Angel M.; and Yanev, Kostadin D., 4,503,498, Cl. 364-200.000.

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Hignite, Alan L.; Wendt, Richard L.; Zeigler, Roy F.; and Zeigler, Warren L., 4,502,375, Cl. 98-115.0LH.

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Johnson, Bruce K.; and Triggs, Charles W., 4,502,767, Cl. 354-86.000.

Trimble, David C., to Hercules Incorporated. Continuous crack and joint overlay. 4,502,814, Cl. 404-107.000.

Triolo, Rocco P., to Scotfoam Corporation. Polyurethane foam and a microbiological metabolizing system. 4,503,150, Cl. 435-41.000.

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Ivester, Frank D.; and Troulias, James R., 4,502,872, Cl. 55-147.000.

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Hosel, Fritz, 4,503,430, Cl. 340-825.520.

TRW Inc.: *See*—
Leiby, John J., 4,502,620, Cl. 225-2.000.

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Tulk, Thomas C.: *See*—
Boitz, Gary L.; and Tulk, Thomas C., 4,502,233, Cl. 33-181.0AT.

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Trubitsyn, Alexandr V.; Fomin, Georgy M.; Nedovizy, Ivan N.; Petrov, Pavel E.; Denisov, Petr I.; Tulupov, Sergei A.; Chursin, Stepan T.; Kuptsynov, Vladimir N.; Merkulov, Adolf K.; and Stobbe, Lev G., 4,502,895, Cl. 148-11.50Q.

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Ty, Henry, to Texas Instruments Incorporated. Fluid flow control apparatus. 4,502,627, Cl. 236-93.00R.

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Booker, David F.; Grove, David E.; Cotterill, Phillip J.; and Tyson, Robert G., 4,503,255, Cl. 568-17.000.

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Ueno, Haruo; Ashitaka, Hidetomo; and Nakajima, Koichi, 4,503,202, Cl. 526-140.000.

Uchita, Takeshi: *See*—
Tomozaki, Ryozo; Uchita, Takeshi; Ide, Hideo; and Suzuki, Misao, 4,502,532, Cl. 165-79.000.

Udovenko, Vitaly K.: *See*—
Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.

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Okumura, Katsuya; Shinki, Toshinori; Sato, Takashi; and Ueda, Masaaki, 4,502,210, Cl. 29-591.000.

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Mouri, Masami; and Uemura, Fumio, 4,502,158, Cl. 2-240.000.
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Ueno, Katsuji; Sugimoto, Hiroaki; and Hayatsu, Kazuo, to Sumitomo Chemical Company, Limited. Process for producing an aromatic polyester fiber. 4,503,005, Cl. 264-102.000.
Uhrner, Klaus-Jurgen, to KACO GmbH+Co. Axial shaft sealing unit with improved housing. 4,502,694, Cl. 277-9.000.
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Phalin, Thomas L.; and Ulmes, James J., 4,502,313, Cl. 72-342.000.
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Umetani, Tetsumasa; and Matsunaga, Katsutoshi, to Hitachi Zosen Corporation. Method and apparatus for producing halogen. 4,502,928, Cl. 204-98.000.
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Unangst, Paul C., to Warner-Lambert Company. Antiallergic 4H-furo[3,2-b]indoles. 4,503,236, Cl. 548-430.000.
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Jordan, Peter A.; and Underhill, Michael J., 4,503,405, Cl. 332-18.000.
Union Camp Corporation: *See—*
Pavlin, Mark S., 4,503,267, Cl. 568-753.000.
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Breck, Donald W., deceased; Blass, Harold, executor; and Skeels, Gary W., 4,503,023, Cl. 423-328.000.
Golembeski, Nancy M.; Jorgensen, Robert J.; Cleland, Robert D.; and Noshay, Allen, 4,503,203, Cl. 526-159.000.
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Potts, James E., 4,503,098, Cl. 427-394.000.
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van Lier, Johannes A.; and Yasuda, Hirotsugu, 4,503,133, Cl. 429-174.000.
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Hucke, Edward E., 4,503,215, Cl. 528-232.000.
Uniroyal, Inc.: *See—*
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United States Brass Corporation: *See—*
Hayman, Dennis J., 4,502,507, Cl. 137-625.400.
United States of America
Agriculture: *See—*
Camirand, Wayne M., 4,503,082, Cl. 426-271.000.
Army: *See—*
Bailey, Walter H., 4,503,432, Cl. 343-7.00A.
Bennett, John G., 4,503,101, Cl. 428-9.000.
F'Geppert, Erwin, 4,502,571, Cl. 188-67.000.
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Lloyd, Milton H.; Collins, Jack L.; and Shell, Sam E., 4,502,987, Cl. 252-635.000.
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Navy: *See—*
Bailey, Theodore B., 4,502,758, Cl. 350-267.000.
Bowling, Donald R.; and Smith, Charles F., 4,503,406, Cl. 333-245.000.
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Peterson, Phillip R.; and Gavrielides, Athanasios, 4,502,756, Cl. 350-162.200.
Taylor, Henry F.; Goldberg, Lew; Rauscher, Christen; and Weller, Joseph F., 4,503,403, Cl. 331-37.000.
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U.S. Philips Corporation: *See—*
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Brewer, Robert J., 4,503,450, Cl. 357-24.000.
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Dielhof, Pieter B., 4,503,464, Cl. 358-164.000.
Hennings, Detlev; and Schreinemacher, Herbert, 4,503,482, Cl. 361-321.000.
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United Technologies Corporation: *See—*
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Bosshart, George S.; and Matarese, Alfred P., 4,503,130, Cl. 428-632.000.
Botwin, Leo; and Simpson, John A., 4,502,649, Cl. 244-3.100.
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Universal Maschinenfabrik Dr. Rudolf Schieber GmbH & Co. KG: *See—*
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University of Akron, The: *See—*
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Banda, Michael J.; Werb, Zena; Knighton, David R.; and Hunt, Thomas K., 4,503,038, Cl. 424-95.000.
Brimhall, George H., Jr.; and Rivers, Mark L., 4,503,555, Cl. 382-6.000.
Unno, Kunihiko; Tsujiuchi, Toshio; and Oda, Yukio, to Toyoda Koki Kabushiki Kaisha. Apparatus for truing a grinding wheel. 4,502,458, Cl. 125-11.00R.
Unvert, Susan D.: *See—*
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UOP Inc.: *See—*
Arena, Blaise J., 4,503,274, Cl. 568-863.000.
Engel, Dusan J.; Malloy, Thomas P.; and Shoffner, James P., 4,503,269, Cl. 568-783.000.
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Himes, James F., 4,503,277, Cl. 585-455.000.
Windawi, Hassan; Grieger, Gene R.; and Oakdale, Warren R., 4,503,162, Cl. 502-174.000.
Upton, John. Water traps. 4,502,500, Cl. 137-247.250.
Urbanic, John E., to Calgon Carbon Corporation. Purification of sugar liquors with activated carbon. 4,502,890, Cl. 127-46.200.
Urquhart, Robert J., to International Business Machines Corporation. Compact high speed hashed array for dictionary storage and lookup. 4,503,514, Cl. 364-900.000.
Ushio, Tetsuji: *See—*
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USM Corporation: *See—*
Elliott, Richard M.; Holland, Larry L.; Gilbride, Andrew J.; Gilligan, Thomas J., III; Ciccia, Lawrence P.; and Martin, John F., 4,503,091, Cl. 427-180.000.
Gilbride, Andrew J.; Morse, Albert I.; Crowell, Douglas H.; and Holland, Larry L., 4,502,411, Cl. 118-503.000.
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van den Goor, Jakobus M., to Lear Siegler, Inc. Conveyor facility. 4,502,593, Cl. 198-781.000.
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Vandierendonck, Jerry L., to Texas Instruments Incorporated. Computing system with multifunctional arithmetic logic unit in single integrated circuit. 4,503,511, Cl. 364-716.000.

Van Dyke, Mark: *See—*
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van Loon, Martien K. C., to Weld-Equip B.V. Automatically controlled arc-welding device for welding tie elements to a work place. 4,503,310, Cl. 219-98.000.

Van Loveren, Augustinus G.: *See—*
Boden, Richard M.; Dekker, Lambert; Schmitt, Frederick L.; and Van Loveren, Augustinus G., 4,503,259, Cl. 568-382.000.

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Venture Tape Corp.: *See—*
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Marr, Rolf; Bart, Hans-Jorg; and Wachter, Reinhard, 4,503,015, Cl. 423-24.000.

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Versatile Corporation: *See—*
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Veyhl, Wolf, 4,502,394, Cl. 108-6.000.

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Searle, Robert F., 4,503,326, Cl. 250-227.000.

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Taplin, Lael B., 4,502,708, Cl. 280-755.000.

Victor Company of Japan, Limited: *See—*
Wada, Yoshiyo; Goto, Kunio; and Takehara, Hideaki, 4,503,529, Cl. 369-126.000.

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Barclay, Donald J.; Morgan, William M.; and Vigar, James M., 4,502,927, Cl. 204-51.000.

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Vingris, Laimonis T.: *See—*
Fastritsky, Viktor S.; Vingris, Laimonis T.; Ardentov, Vasily V.; Florinsky, Jury B.; Plotnikov, Viktor I.; Rodnevsky, Leonid A.; and Alexeev, Gennady N., 4,503,392, Cl. 324-232.000.

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Virginia Chemicals, Inc.: *See—*
Gupton, B. Franklin; and Little, Edwin D., 4,503,262, Cl. 568-575.000.

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Vye, Michael B.: *See—*
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Wade, James J., to Riker Laboratories, Inc. Substituted imidazo[1,2-c]pyrimidines. 4,503,050, Cl. 514-222.000.

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Walls, John E., to American Hoechst Corporation. Process for aluminum surface preparation. 4,502,925, Cl. 204-33.000.

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Wandel, David M., to General Motors Corporation. Turbocharged engine driven positive displacement blower having a bypass passage. 4,502,283, Cl. 60-609.000.

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Cook, Phillip D.; and McNamara, Dennis J., 4,503,235, Cl. 548-301.000.
Unangst, Paul C., 4,503,236, Cl. 548-430.000.
Warnke, Patsy L. Popcorn bag. 4,503,559, Cl. 383-40.000.
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Watase, Tosio; Mori, Koichi; Sasaki, Kazuo; Onizuka, Katsumi; Yoshikawa, Yuzo; and Fujita, Takeshi, to KK Yamamoto Suiatsu Kogyosho. Method and apparatus for performing a hydraulic pressure test on a tube. 4,502,323, Cl. 73-49.600.
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Wawra, Helmut; and Schuliers, Wolfgang, to Daimler-Benz Aktiengesellschaft. Electrically conducting connector for mutually rotatable components. 4,502,746, Cl. 339-3.00S.
Weaver, Charles S., to SRI International. Method and apparatus for digital data compression. 4,503,510, Cl. 364-715.000.
Weaver, James B. Semirecumbent tandem bicycle. 4,502,705, Cl. 280-231.000.
Weber, Karl-Heinz: *See*—
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Weigle, Robert M.; Duggan, Sharon; Foster, Candace; Miner, Jonathan; Vantucci, John; and Woozley, Mark, to United States of America, Health and Human Services. Drill guide for bone plate fixation. 4,502,475, Cl. 128-92.0EB.
Weiland, Werner. Device for veterinary obstetrical delivery. 4,502,486, Cl. 128-353.000.
Weiler, Gerhard H.; Anderson, Paul A.; and Pagels, Louis T., to Automatic Liquid Packaging, Inc. Sterilizing apparatus for an encapsulating machine. 4,502,614, Cl. 222-148.000.
Weinstock, George M.: *See*—
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Weissert, Helmut; and Hegemann, Karl-Rudolf, to Gottfried Bischoff Bau kompl. Gasreinigungs- und Wasserruckkuhlanlagen GmbH & Co. Kommanditgesellschaft. Method of producing calcium sulfate semihydrate in conjunction with the desulfurization of flue gases. 4,503,020, Cl. 423-242.000.
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Wellington, Scott L.; Reisberg, Joseph; Lutz, Eugene F.; and Bright, David B., to Shell Oil Company. Polyalkoxy sulfonate, CO_2 and brine drive process for oil recovery. 4,502,538, Cl. 166-252.000.
Wells, Peter M., Jr., to Ideal Industries, Inc. Switchless voltage, continuity and polarity indicator. 4,503,390, Cl. 324-133.000.
Welt, Claire Doolin. Protective eye cover. 4,502,476, Cl. 128-132.00R.
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Werner, Christian; and Klier, Michael, to TDeutsche Forschungs-und Versuchsanstalt fur Luft-und Raumfahrt e.V. Linder Hohe. Method and laser apparatus for measuring visual range, slant visual range and cloud altitude. 4,502,782, Cl. 356-5.000.
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Westerlund, Tage S., to Linden-Alimak AB. Drive system for wire rope hoists. 4,502,570, Cl. 187-22.000.
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White, James E.; Lobanoff, Mark; and Harris, Robert A., to Irvin Industries, Inc. Automobile compartment cover with drop panel. 4,502,674, Cl. 296-37.160.
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Yagi, Eiji; Hatori, Yukiyoshi; and Kobari, Yuji, to Nissan Motor Company, Limited. Steering effort sensor. 4,503,297, Cl. 200-61.390.
Yagi, Taizo, to Horiba, Ltd. Optical fiber joint type ion-concentration measurement apparatus. 4,502,937, Cl. 204-406.000.
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Yahano, Toshi, to Fujitsu Limited. Method of manufacturing an MIS type semiconductor device. 4,502,205, Cl. 29-576.00B.
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Yamada, Yukihiko, to Kyodo Electric Co., Ltd. Multi-headed screw. 4,502,825, Cl. 411-5.000.
Yamagata, Ichiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Multi-stage hydraulic machine. 4,502,835, Cl. 415-104.000.
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Yokota, Tsuneshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Automatic focusing device. 4,503,324, Cl. 250-201.000.
Yokoyama, Hiroyuki, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece. 4,502,790, Cl. 368-200.000.
Yokoyama, Tadashi: *See*—
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Yokozawa, Masami; and Kanai, Isao, to Matsushita Electronics Corporation. Plastic encapsulated semiconductor device and method for manufacturing the same. 4,503,452, Cl. 357-72.000.
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Yong, Raymond N.; and Sethi, Amar J., to Suncor, Inc. Destabilization of sludge with hydrolyzed cassava starch flocculants. 4,502,961, Cl. 210-728.000.
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Yoshimura, Tatsushiro; Terada, Tsutomu; and Nakayama, Shozo, to Daikin Kogyo Co., Ltd.; and Kabushikikaisha Tyoda Jidoshokki Seisakusho. Aqueous fluorine-containing rubber coating composition and article coated therewith. 4,503,179, Cl. 524-262.000.
Yoshinaga, Sadao; Tajiri, Yoshinobu; and Mashine, Hiroyoshi, to Prince Industrial Development Co., Ltd.; and Koizumi Sangyo Co., Ltd. Catalyst combustion curling device. 4,502,465, Cl. 126-409.000.
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Yumoto, Takaari; Hayakawa, Kiyoshi; Kawase, Kaoru; Yamakita, Hiromi; and Taoda, Hiroshi, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Method for manufacture of 7-substituted quadricyclene-cyclodextrin inclusion compound. 4,502,930, Cl. 204-160.100.
Yun, Shyun-long; Leon, Luis P.; and Ahmad, Syed I., to Technicon Instruments Corporation. Method for eliminating turbidity in a biological fluid and reagent therefor. 4,503,146, Cl. 435-19.000.
Zacharias, Ernst, to Matth. Hohner AG. Mouth organ. 4,502,362, Cl. 84-377.000.
Zafred, Paolo R., to Westinghouse Electric Corp. Tube plug. 4,502,511, Cl. 138-89.000.
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Zehl, Otis G.; Price, Michael G.; and David, Edward H., Jr., to Litton Systems, Inc. Method and device for centroid detection of a beam of electromagnetic energy. 4,503,382, Cl. 324-77.00K.
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Gnutov, Anatoly N.; Golberg, Boris S.; Zelenskaya, Nadezhda N.; Kaporovich, Vladimir G.; Kaporovich, Vladimir V.; Pirogov, Varlen K.; Romanov, Jury V.; Sereda, Viktor G.; Sidorov, Jury P.; Udovenko, Vitaly K.; and Tsoglin, Aron N., 4,502,310, Cl. 72-69.000.
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Zucker, Jerry; Hawkins, John W.; and O'Brien, John J., to RM Industrial Products Company, Inc. Composite fibrous packing material containing fibers of aromatic sulfide polymers. 4,502,364, Cl. 87-8.000.
Zucker, Stanley. Roadway barrier and restraining cap combination. 4,502,812, Cl. 404-6.000.
Zuckerman, Matthew, to Capital Controls. Apparatus and method for measuring the concentration of gases. 4,502,321, Cl. 73-23.000.
Zullo, Antonio, to Sasib S.p.A. Feeler pins device for cigarette groups. 4,502,261, Cl. 53-54.000.
Zurcher, Erwin; and Cottenceau, Remi, to Sirs - Societe Internationale de Revetements de Sol S.A. Process and apparatus for ultrasonically welding threads to a material. 4,502,902, Cl. 156-73.200.
Zuzinec, Raymond R., Sr.: *See*—
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501 Qume Corporation: *See*—
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LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF MARCH, 1985

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Brower, James R.: *See*—
Noble, Maynard G.; and Brower, James R., Re. 31,843, Cl. 523-212.000.

Danfoss A/S: *See*—
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General Electric Company: *See*—
Noble, Maynard G.; and Brower, James R., Re. 31,843, Cl. 523-212.000.

Madsen, Ingvard M.; and Andersen, Niels I., to Danfoss A/S. Atomizer burner for oil firing plant. Re. 31,841, Cl. 431-208.000.

Noble, Maynard G.; and Brower, James R., to General Electric Company. Flame retardant compositions. Re. 31,843, Cl. 523-212.000.

Pettingell, Winslow L., to Foam Cutting Engineers, Inc. Method of applying modifying ingredients to open-celled polyurethane material. Re. 31,844, Cl. 427-244.000.

Top Tool Company, Inc.: *See*—
Weitz, Robert D., Re. 31,842, Cl. 166-312.000.

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Allis-Chalmers Corp.: *See*—
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American Cyanamid Company: *See*—
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Avila, Robert M.: *See*—
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Barrett, John L. Two-wheeled roller skate. 277,885, 3-5-85, Cl. D21-226.000.

Beck, George P. Airway airflow indicator for facilitating blind nasal or blind oral intubation of the trachea and the like. 277,889, 3-5-85, Cl. D24-17.000.

Bergstedt, Lowell C. Child's growth measuring and registering unit. 277,833, 3-5-85, Cl. D10-71.000.

Bergstrom, Par H. S.; and Jelvestam, Roland E. Transmitter for in-line connection by measuring of fluid consistency. 277,831, 3-5-85, Cl. D10-46.000.

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Brown, Harry, to Strombecker Corporation. Bubble pipe. 277,879, 3-5-85, Cl. D21-61.000.

Brown, Marion F., Sr, to Consolidated Foods Corporation. Container cap. 277,826, 3-5-85, Cl. D9-439.000.

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Camino Laboratories: *See*—
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Chatani, Yasushi, to Kawada Co., Ltd. Activity toy. 277,878, 3-5-85, Cl. D21-59.000.

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CLASS 127

46.2	4,502,890

CLASS 128

18	4,502,468
24.1	4,502,469
64	4,502,470
75	4,502,471
80 F	4,502,472
90	4,502,479
92 A	4,502,473
92 EB	4,502,475
92 H	4,502,474
132 R	4,502,476
133	4,502,477
136	4,502,478
201.15	4,502,480
205.24	4,502,481
207.15	4,502,482
303 R	4,502,483
317	4,502,484
321	4,502,485
353	4,502,486
665	4,502,487
692	4,502,488
746	4,502,489
780	4,502,490
782	4,502,491
785	4,502,492

CLASS 130

24	4,502,493

CLASS 131

276	4,502,494
328	4,502,495

CLASS 132

40	4,502,496
84 R	4,502,497
137	4,502,498

CLASS 133

6	4,502,499

CLASS 134

4	4,502,891
6	4,502,892
10	4,502,893

CLASS 137

247.25	4,502,500
487	4,502,501
512.3	4,502,502
527.8	4,502,503
544	4,502,504
615	4,502,505
624.12	4,502,506
625.4	4,502,507
625.69	4,502,508

CLASS 138

37	4,502,509
45	4,502,510
89	4,502,511

CLASS 139

116	4,502,512
383 R	4,502,513

CLASS 141

1	4,502,514
195	4,502,515
290	4,502,516

CLASS 142

49	4,502,517

CLASS 144

286 A	4,502,518

CLASS 148

1.5	4,502,894
11.5 F	4,502,896
11.5 Q	4,502,895
12 F	4,502,897

188 4,502,898
431 4,502,899
440 4,502,900

CLASS 150

55 4,502,519

CLASS 152

330 R 4,502,520
381.4 4,502,521

CLASS 156

39 4,502,901
73.2 4,502,902
153 4,502,903
157 4,502,904
184 4,502,905
251 4,502,906
349 4,502,907
350 4,502,908
356 4,502,909
361 4,502,910
499 4,502,911
548 4,502,912
643 4,502,913
4,502,914
4,502,915
4,502,916
645 4,502,917

CLASS 160

121 R 4,502,522
174 4,502,523

CLASS 162

24 4,502,918

CLASS 164

66.1 4,502,524
241 4,502,525
415 4,502,526
418 4,502,527
463 4,502,528

CLASS 165

47 4,502,529
72 4,502,530
76 4,502,531
79 4,502,532
154 4,502,533

CLASS 166

84 4,502,534
105 4,502,535
105.5 4,502,536
162 4,502,537
252 4,502,538
262 4,502,539
274 4,502,540
275 4,502,541
312 Re.31,842
325 4,502,542
359 4,502,543

CLASS 172

283 4,502,544
311 4,502,545
4,502,546
606 4,502,547
705 4,502,548

CLASS 173

12 4,502,549

CLASS 174

22 R 4,503,283
36 4,503,284
68.5 4,503,285

CLASS 175

4.6 4,502,550
6 4,502,551
56 4,502,552
59 4,502,553
285 4,502,554

CLASS 177

25 4,502,555

CLASS 178

18 4,503,286
22.08 4,503,287

CLASS 179

2 DP 4,503,288
16 F 4,503,289
18 FC 4,503,290
90 AN 4,503,291
178 4,503,292

CLASS 180

8.6 4,502,556
14.2 4,502,557
14.3 4,502,558
75 4,502,559
190 4,502,560

CLASS 181

131 4,502,562

CLASS 182

153 4,502,563
161 4,502,564
184 4,502,565
214 4,502,566

CLASS 184

7.4 4,502,567

CLASS 187

9 R 4,502,568
17 4,502,569
22 4,502,570

CLASS 188

67 4,502,571
72.8 4,502,572
79.5 P 4,502,573
4,502,574
282 4,502,575

CLASS 190

18 R 4,502,576

CLASS 192

0.052 4,502,579
4 A 4,502,577
26 4,502,578
58 B 4,502,580
70.14 4,502,581
85 AA 4,502,582
98 4,502,583

CLASS 194

1 G 4,502,584

CLASS 196

14.52 4,502,919

CLASS 198

345 4,502,585
4,502,586
347 4,502,587
409 4,502,588
484 4,502,589
611 4,502,590
621 4,502,591
627 4,502,592
781 4,502,593
836 4,502,594
853 4,502,595

CLASS 200

5 A 4,503,294
35 R 4,503,295
50 B 4,503,293
61.27 4,503,296
61.39 4,503,297
4,503,298
61.52 4,503,299
61.54 4,503,300
83 D 4,503,301
147 R 4,503,302
156 4,503,303

CLASS 202

120 4,502,920
154 4,502,921
248 4,502,922

CLASS 203

71 4,502,923

CLASS 204

16 4,502,924
33 4,502,925
45.1 4,502,926
51 4,502,927
98 4,502,928
147 4,502,929
160.1 4,502,930
192 C 4,502,931
192 EC 4,502,932
206 4,502,933
242 4,502,934
253 4,502,935
290 F 4,502,936
406 4,502,937
412 4,502,938
429 4,502,939

CLASS 206

387 4,502,596
392 4,502,597
444 4,502,598
554 4,502,599
626 4,502,600

CLASS 208

8 LE 4,502,940
10 4,502,941
11 R 4,502,942
44 4,502,943
45 4,502,944
120 4,502,945
152 4,502,946
161 4,502,947
183 4,502,948
207 4,502,949
309 4,502,950

CLASS 209

21 4,502,951

CLASS 210

86 4,502,952
94 4,502,953
136 4,502,954
149 4,502,955
248 4,502,956
690 4,502,957
695 4,502,958
705 4,502,959
728 4,502,960
4,502,961
749 4,502,962

CLASS 211

41 4,502,601
59.1 4,502,602

CLASS 215

11 C 4,502,603
206 4,502,604
230 4,502,605
274 4,502,606

CLASS 219

10.49 R 4,503,304
10.51 4,503,305
10.55 E 4,503,307
10.55 F 4,503,306
10.73 4,503,308
69 M 4,503,309
98 4,503,310
109 4,503,311
117.1 4,503,312
121 ED 4,503,314
121 LE 4,503,315
121 LG 4,503,313
130.32 4,503,316
225 4,503,317
384 4,503,318
390 4,503,319
441 4,503,320
449 4,503,321
505 4,503,322

CLASS 220

70 4,502,607
90.4 4,502,608
329 4,502,609
346 4,502,610

CLASS 221

93 4,502,611
185 4,502,612

CLASS 222

103 4,502,613
148 4,502,614
199 4,502,615
215 4,502,616
385 4,502,617
396 4,502,618

CLASS 224

311 4,502,619

CLASS 225

2 4,502,620
16 4,502,621

CLASS 227

67 4,502,622

CLASS 229

1.5 B 4,502,623
41 C 4,502,624

CLASS 235

489 4,503,323

CLASS 236

11 4,502,625
20 R 4,502,626
93 R 4,502,627

CLASS 238

122 4,502,628

CLASS 239

3 4,502,629
34 4,502,630
106 4,502,631
125 4,502,632
132.3 4,502,633
223 4,502,634
251 4,502,635
265.17 4,502,636
4,502,637
265.29 4,502,638
265.31 4,502,639
346 4,502,640

CLASS 241

5 4,502,641
79.1 4,502,642
257 R 4,502,643

CLASS 242

84.2 G 4,502,645
129.8 4,502,644
149 4,502,646
191 4,502,647
192 4,502,648

CLASS 244

3.1 4,502,649
3.15 4,502,650
53 B 4,502,651
75 A 4,502,652

CLASS 248

55 4,502,653
168 4,502,654
228 4,502,655
346 4,502,656
451 4,502,657
452 4,502,658

CLASS 249

66 R 4,502,659
144 4,502,660

CLASS 250

201 4,503,324
204 4,503,325
227 4,503,326
261 4,503,327
262 4,503,328
309 4,503,329
357.1 4,503,330
363 S 4,503,331
366 4,503,332
455.1 4,503,333
491.1 4,503,334
548 4,503,335
578 4,503,336

CLASS 251

30 4,502,661
149.6 4,502,662
174 4,502,663

CLASS 252

8.5 C 4,502,964
4,502,965
4,502,966
8.5 P 4,502,963
8.55 R 4,502,967
4,502,969
8.8 4,502,968
32.7 E 4,502,970
33.3 4,502,971
47 4,502,972
73 4,502,973
299.63 4,502,974
315.1 4,502,975
315.4 4,502,976
340 4,502,977
389 A 4,502,978
389 R 4,502,979
500 4,502,980
512 4,502,981
513 4,502,982
516 4,502,983
518 4,502,984
522 R 4,502,985
526 4,502,986
635 4,502,987

CLASS 254

10.5 4,502,664
29 R 4,502,665
134.3 FT 4,502,666
350 4,502,667
391 4,502,668

CLASS 260

239.1 4,502,988
239.57 4,502,989
245.2 R 4,502,990
397.2 4,502,991
410.9 R 4,502,992
415 4,502,993
456 A 4,502,994
465 C 4,502,997
465 G 4,502,995
4,502,996
4,502,999
4,503,000
465 R 4,502,998
465.3 4,503,001
945 4,503,002

CLASS 261

51 4,503,003

CLASS 264

3 R 4,503,004
102 4,503,005
148 4,503,006
210.7 4,503,007
342 R 4,503,008

CLASS 266

114 4,502,669
220 4,502,670
256 4,502,671

CLASS 267

64.17 4,502,672
64.24 4,502,673

CLASS 270

40 4,502,675
45 4,502,676

CLASS 271

104 4,502,677
270 4,502,678

CLASS 272

69 4,502,679
96 4,502,680
142 4,502,681
144 4,502,682

CLASS 273

23 4,502,683
26 E 4,502,684
29 A 4,502,685
126 R 4,502,686
171 4,502,687
189 A 4,502,688
265 4,502,689
326 4,502,690
349 4,502,691
423 4,502,692

CLASS 277

3 4,502,693
9 4,502,694
12 4,502,695
4,502,696
41 4,502,697
43 4,502,698
74 4,502,699
80 4,502,700
92 4,502,701
101 4,502,702

CLASS 279

2 A 4,502,703
111 4,502,704

CLASS 280

231 4,502,705
415 A 4,502,706
446 B 4,502,561
682 4,502,707
755 4,502,708
758 4,502,709
804 4,502,710

CLASS 281

5 4,502,711

CLASS 282

22 A 4,502,712

CLASS 283

1 B 4,502,713

CLASS 285

47 4,502,714

CLASS 290

4 D 4,503,337
38 R 4,503,338

CLASS 292

78 4,502,715
142 4,502,716
316 4,502,717
336.3 4,502,718
347 4,502,719
348 4,502,720

CLASS 294

1.1 4,502,721
61 4,502,722
88 4,502,723

CLASS 296

1 S 4,502,724
37.16 4,502,674
181 4,502,725
221 4,502,726

CLASS 297

209 4,502,727
284 4,502,728
301 4,502,729
366 4,502,730
452 4,502,731
488 4,502,732

CLASS 299

2 4,502,733
88 4,502,734

CLASS 303

24 F 4,502,735

CLASS 305

9 4,502,736

CLASS 307

296 R 4,503,339
360 4,503,340
450 4,503,341
475 4,503,342
482 4,503,343
594 4,503,344
605 4,503,345

CLASS 308

6 C 4,502,737

CLASS 310

49 R 4,503,346
4,503,368
68 C 4,503,347
155 4,503,348
178 4,503,349
321 4,503,350
329 4,503,351
359 4,503,352
361 4,503,353

CLASS 312

108 4,502,741
324 4,502,742

CLASS 313

382 4,503,354
402 4,503,355
634 4,503,356

CLASS 315

1 4,503,357
58 4,503,358
105 4,503,359
112 4,503,360
221 4,503,361
4,503,362
225 4,503,363
308 4,503,364
310 4,503,365
370 4,503,366
371 4,503,367

CLASS 318

254 4,503,369
331 4,503,370
443 4,503,371
560 4,503,372
570 4,503,373
616 4,503,374
802 4,503,375
4,503,376
807 4,503,377

CLASS 320

20 4,503,378

CLASS 323

206 4,503,380
315 4,503,381

CLASS 324

61 P 4,503,383
4,503,384
71.4 4,503,385
73 R 4,503,386
4,503,387
77 K 4,503,382
4,503,388
133 4,503,389
4,503,390
208 4,503,391
232 4,503,392
235 4,503,393
252 4,503,394
253 4,503,395

CLASS 328

127 4,503,396
138 4,503,397

CLASS 330

285 4,503,398

CLASS 331

1 A 4,503,400
4 4,503,401
36 C 4,503,402
37 4,503,403
96 4,503,404

CLASS 332

18 4,503,405

CLASS 333

21 A 4,503,379
245 4,503,406

CLASS 335

35 4,503,408
132 4,503,409
153 4,503,410
170 4,503,412
259 4,503,411

CLASS 336

192 4,503,413

CLASS 337

31 4,503,414
160 4,503,415

CLASS 338

99 4,503,416
176 4,503,417
309 4,503,418

CLASS 339

3 S 4,502,746
14 L 4,502,743
14 R 4,502,744
17 C 4,502,745
75 M 4,502,747
89 M 4,502,748
177 R 4,502,749
275 R 4,502,750

CLASS 340

59 4,503,419
347 DA 4,503,421
347 DD 4,503,420
543 4,503,422
552 4,503,423
573 4,503,399
617 4,503,424
680 4,503,425
711 4,503,426
731 4,503,427
792 4,503,428
799 4,503,429
825.52 4,503,430
870.13 4,503,431

CLASS 343

7 A 4,503,432
7.5 4,503,433
373 4,503,434
781 P 4,503,435
876 4,503,436

CLASS 346

1.1 4,503,437
74.4 4,503,438
74.5 4,503,439
4,503,440
139 R 4,503,441
140 R 4,503,442
4,503,443
4,503,444
141 4,503,445
209 4,503,446

CLASS 350

6.4 4,502,751
6.6 4,502,752
96.16 4,502,753
96.20 4,502,754
128 4,502,755
162.2 4,502,756
173 4,502,757
267 4,502,758
318 4,502,760
345 4,502,761
394 4,502,762
582 4,502,763
636 4,502,759

CLASS 351

110 4,502,765
160 R 4,502,764
206 4,502,766

CLASS 354

86 4,502,767
145.1 4,502,768
152 4,502,769
173.11 4,502,770
289.1 4,502,771
312 4,502,772
403 4,502,773
4,502,774
416 4,502,775

CLASS 355

14 C 4,503,407
14 E 4,502,778
14 R 4,502,777
14 SH 4,502,776
15 4,502,779
4,502,780
79 4,502,781

CLASS 356

5 4,502,782
152 4,502,783
222 4,502,784
376 4,502,785
435 4,502,786

CLASS 357

16 4,503,447
23.13 4,503,448
23.4 4,503,449
24 4,503,450
50 4,503,451
72 4,503,452

CLASS 358

13 4,503,453
4,503,454
19 4,503,455
51 4,503,456
75 4,503,457
4,503,458
111 4,503,459
4,503,460
4,503,461
122 4,503,462
148 4,503,463
164 4,503,464
195.1 4,503,465
211 4,503,466
212 4,503,467
256 4,503,468
287 4,503,469

CLASS 360

33.1 4,503,470
43 4,503,472
69 4,503,471
128 4,503,473
133 4,503,474
137 4,503,475
4,503,476

CLASS 361

2 4,503,477
79 4,503,478
90 4,503,479
152 4,503,480
321 4,503,482
341 4,503,481
385 4,503,483
395 4,503,484
424 4,503,485

CLASS 362

61 4,503,486
80 4,503,487
4,503,488
101 4,503,489

CLASS 364

170 4,503,493
200 4,503,490
4,503,491
4,503,492
4,503,494
4,503,495
4,503,496
4,503,497
4,503,498
4,503,499
4,503,500
300 4,503,501
400 4,503,502
405 4,503,503
425 4,503,504
431.08 4,503,505
513 4,503,506
4,503,507
525 4,503,508
571 4,503,509
715 4,503,510
716 4,503,511
761 4,503,512
900 4,503,513
4,503,514
4,503,515
4,503,516

CLASS 365

36 4,503,517
104 4,503,518
4,503,519
177 4,503,520
182 4,503,521
203 4,503,522
210 4,503,523
218 4,503,524
222 4,503,525

CLASS 366

149 4,502,787

CLASS 367

20 4,503,526
53 4,503,527
198 4,503,528

CLASS 368

10 4,502,788
27 4,502,789
200 4,502,790
289 4,502,791

CLASS 369

126 4,503,529
270 4,503,530
275 4,503,531

CLASS 370

1 4,503,532
85 4,503,533

CLASS 371

9 4,503,534
11 4,503,535
25 4,503,536
4,503,537
28 4,503,538

CLASS 372

45 4,503,539
47 4,503,540
50 4,503,541
58 4,503,542
94 4,503,543

CLASS 374

1 4,502,792
124 4,502,793
194 4,502,794

CLASS 375

10 4,503,544
34 4,503,545
37 4,503,546
76 4,503,547

CLASS 377

39 4,503,548
49 4,503,549
63 4,503,550

CLASS 378

28 4,503,551
196 4,503,552

CLASS 381

24 4,503,553
28 4,503,554

CLASS 382

6 4,503,555
9 4,503,556
34 4,503,557

CLASS 383

3 4,503,558
40 4,503,559
66 4,503,560
102 4,503,561

CLASS 384

103 4,502,795
439 4,502,796
477 4,502,738
481 4,502,739

CLASS 400

55 4,502,797
66 4,502,798
124 4,502,799
144.2 4,502,800
208 4,502,801
212 4,502,802
219.2 4,502,803
641 4,502,804
647.1 4,502,805

CLASS 401

137 4,502,806

CLASS 403

11 4,502,807
24 4,502,808
28 4,502,809
231 4,502,810
391 4,502,811

CLASS 404

6 4,502,812
102 4,502,813
107 4,502,814

CLASS 405

17 4,502,815
30 4,502,816
186 4,502,817
259 4,502,818

CLASS 406

14 4,502,819
56 4,502,820

CLASS 408

124 4,502,821

CLASS 409

32 4,502,822
134 4,502,823
234 4,502,824

CLASS 411

5 4,502,825
340 4,502,826

CLASS 414

217 4,502,827
226 4,502,828
730 4,502,829
735 4,502,830

CLASS 415

1 4,502,831
10 4,502,832
17 4,502,833
26 4,502,834
104 4,502,835
150 4,502,836
198.1 4,502,837
202 4,502,838
4,502,839

CLASS 416

114 4,502,840
220 R 4,502,841

CLASS 417

8 4,502,842
56 4,502,843
275 4,502,844
288 4,502,845
362 4,502,846
380 4,502,847
4,502,848
407 4,502,849
440 4,502,850
516 4,502,851

CLASS 418

2 4,502,853
15 4,502,854
4,502,855
55 4,502,852
137 4,502,856

CLASS 419

6 4,503,009
27 4,503,010

CLASS 422

73 4,503,011
100 4,503,012
127 4,503,013
135 4,503,014

CLASS 423

24 4,503,015
4,503,016
87 4,503,017
168 4,503,018
175 4,503,019
242 4,503,020
297 4,503,021
321 R 4,503,022
328 4,503,023
4,503,024
384 4,503,025
447.4 4,503,026
450 4,503,027
588 4,503,028
652 4,503,029

CLASS 424

15 4,503,030
4,503,031
40 4,503,032
47 4,503,033
80 4,503,034
85 4,503,035
92 4,503,036
94 4,503,037
95 4,503,038
101 4,503,039
114 4,503,040
115 4,503,041
195 4,503,048
195.1 4,503,047
305 4,503,072

CLASS 425

29 4,502,857
204 4,502,858

CLASS 426

1 4,503,077
17 4,503,078
54 4,503,079
94 4,503,080
268 4,503,081
271 4,503,082
438 4,503,127
553 4,503,083
573 4,503,084

CLASS 427

34 4,503,085
54.1 4,503,086
55 4,503,087
58 4,503,088
86 4,503,089
96 4,503,090
180 4,503,091
213 4,503,092
244 Re.31,844
248.1 4,503,093
250 4,503,094
265 4,503,095
359 4,503,096
386 4,503,097
394 4,503,098
428 4,503,100

CLASS 428

9 4,503,101
35 4,503,102
4,503,103
36 4,503,104
4,503,105
40 4,503,106
4,503,107
108 4,503,108
161 4,503,109
164 4,503,110
195 4,503,111
216 4,503,112
234 4,503,113
247 4,503,114
281 4,503,115
286 4,503,116
311.7 4,503,117
323 4,503,118
336 4,503,119
4,503,120
4,503,121
349 4,503,123
372 4,503,124
408 4,503,125
412 4,503,126
425.8 4,503,099
446 4,503,128
562 4,503,129
632 4,503,130
672 4,503,131
678 4,503,122

CLASS 429

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D2—	27	277,805	D7—	77	277,821	D11—	155	277,837		13	277,853	D17—	21	277,869		226	277,885
		277,806		385	277,822	D12—	125	277,838		80	277,854	D18—	1	277,870		234	277,886
		277,807	D9—	300	277,823		169	277,839		100	277,855		9	277,871	D23—	31	277,887
		277,808		367	277,824		181	277,840		103	277,856		12	277,872	D24—	10	277,888
	320	277,809		436	277,825		183	277,841		106	277,857	D19—	36	277,873		17	277,889
	383	277,810		439	277,826		211	277,842		114	277,858		52	277,874		20	277,890
D3—	31	277,811		447	277,827		317	277,843			277,859		88	277,875		31	277,891
	39	277,812		454	277,828	D13—	5	277,845	D15—	11	277,860	D20—	11	277,876	D26—	24	277,892
D6—	349	277,813	D10—	38	277,829		8	277,844		23	277,861	D21—	59	277,877		37	277,893
	446	277,816		39	277,830		24	277,846		29	277,862			277,878	D27—	8	277,894
	449	277,819		46	277,831		32	277,847		69	277,863		61	277,879	D28—	8.1	277,895
	471	277,817		60	277,832			277,848		128	277,864		65	277,880		78	277,896
	510	277,818		71	277,833	D14—	2	277,849		132	277,865		130	277,881	D32—	16	277,897
	520	277,815		72	277,834			277,850		199	277,866		145	277,882	D34—	11	277,898
	534	277,814		81	277,835		11	277,851	D16—	6	277,867		148	277,883			

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04	:	277,835			277,886			277,884		277,806			277,876	40	:	277,834
06	:	277,813			277,892	18	:	277,824		277,807			277,891	41	:	277,866
		277,818			277,893	19	:	277,885		277,827	37	:	277,810	42	:	277,844
		277,832			277,898	20	:	277,828		277,890			277,826	48	:	277,820
		277,833	08	:	277,811			277,882	29	: 277,871	39	:	277,816			277,869
		277,841	09	:	277,821	23	:	277,815	34	: 277,855			277,822			277,870
		277,842			277,863	24	:	277,809		277,857			277,838			277,889
		277,843	12	:	277,804	25	:	277,808	36	: 277,817			277,856	52	:	277,897
		277,853	13	:	277,851	26	:	277,852		277,823			277,868	55	:	277,819
		277,864	17	:	277,836			277,895		277,829			277,880			277,861
		277,875			277,848	27	:	277,805		277,846			277,881			277,887
		277,883			277,879											

PLANT PATENTS

06	:	5,410	41	:	5,412						

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[Notice of Dec. 16, 1969, 869 O.G. 6877]

08	:	T105,201	47	:	T105,202						

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